



CAN YOUR PHONE
GET YOU FIT?

micro mart

Computing in the know

Plus

- What Happened To The 3D Printing Revolution?
- Home Theatre PCs Vs Media Streamers: Which Is Best?
- The Ereader Apps That Give Amazon A Run For Its Money

38

BRILLIANT TWEAKS TO GIVE YOUR PCA BOOST

SPEED UP YOUR COMPUTER WITHOUT SPENDING ANYTHING

Nighthawk X4 802.11ac AC2350 Dual Band Gigabit Smart WiFi Router

AC2350



Model# R7500

The Next Big Thing in WiFi is Here.
Netgear Quad-Stream architecture takes your WiFi to the next level.

Nighthawk AC2350 Smart WiFi Router—Dual Band Gigabit

- | |
|--|
| <ul style="list-style-type: none">✓ The Nighthawk X4 AC2350 WiFi Router with Quad-Stream X4 Architecture, delivers the single fastest WiFi connection, up to 1.73Gbps, and a combined speed of 2.33Gbps. With next generation Wave 2 WiFi, a 1.4GHz dual core processor, and features like Dynamic QoS, X4 delivers unmatched performance for gaming, streaming and mobile connectivity.✓ Quad Stream AC2350 WiFi—600+1733 Mbps† speeds✓ 1.4GHz Dual Core Processor✓ Dynamic QoS bandwidth prioritization✓ Twin USB 3.0 and eSATA ports✓ Four high-performance Beamforming external antennas✓ 100% faster for mobile devices |
|--|

£229.99
inc VAT

CCL Code - NET1979

call: 08000 50 10 10

visit: www.cclonline.com

find us: CCL Computer Ltd, Inmoor Road
Off Cross Lane, BRADFORD, BD11 2PS

Prices correct at time of going to publishing (16th December 2014).

Images are for illustrative purposes only.

Monitors and desktop bundles are available separately.

Games shows as compatible are not included.



Nighthawk 802.11ac AC1900 Dual Band Gigabit Smart WiFi Router

AC1900



Model# R7000

100% Faster for Mobile Devices
Accelerate your WiFi with NETGEAR Nighthawk! with speeds up tp 1900Mbps

Nighthawk AC1900 Smart WiFi Router—Dual Band Gigabit

- ✓ Beamforming+ improves range & performance
- ✓ High powered amplifiers & antennas to extend your WiFi coverage
- ✓ Upstream & downstream QoS for best gaming & video streaming experience
- ✓ Free automatic backup software for Windows® PC & Time Machine®compatible for Macs
- ✓ AC1900 WiFi—600+1300 Mbps† speeds
- ✓ 1GHz Dual Core Processor
- ✓ Advanced features for lag-free gaming
- ✓ Four (4) Gigabit Ethernet ports
- ✓ Prioritized bandwidth for streaming videos or music
- ✓ 100% faster for mobile devices

£162.99
inc VAT

CCL Code - NET1731

call: 08000 50 10 10

visit: www.cclonline.com

find us: CCL Computer Ltd, Inmoor Road
Off Cross Lane, BRADFORD, BD11 2PS

Prices correct at time of going to publishing (16th December 2014).

Images are for illustrative purposes only.

Monitors and desktop bundles are available separately.

Games shows as compatible are not included.



Contents

This week...

18

**Whatever
Happened To
The 3D Printing
Revolution?**

26
**Apple's
Design
Secrets**

08

**38 Brilliant
Tweaks To Give
Your PC A Boost**

**08 38 Brilliant Tweaks
To Give Your PC A
Boost**

John Buchan once wrote a classic novel involving 39 steps, but that was back in 1915... 100 years later, we've got 39 steps you can take to improve your PC's performance – no mystery involved

**18 Whatever Happened
To The 3D Printing
Revolution**

Last year was supposed to be the year 3D printing went mainstream, but while it did enter the public consciousness to a greater degree, it didn't exactly set the world on fire. Sarah Dobbs wonders why not and if it ever will

**22 Can Your Smartphone
Make You Fitter?**

Well, it's that time of year again, when we pledge to live a healthier lifestyle - for January, at least. This year, though, rather than signing up for an expensive gym, Sarah wondered whether she could rely on her smartphone to help her get healthier

**26 Apple's Design
Secrets**

While the Cult Of Apple may not be what it was under Steve Jobs, its design aesthetics are still held in very high esteem. That's down to Jonathan Ive – Jony to those who know him (and a few that don't). What makes his work stand out? David Briddock takes a look

56 Do You Need A Media PC?



70 iOS Fitness Apps

56 Do You Need A Media PC?

Leo Maxwell wonders whether he really needs a new media centre PC, or will one of the new generations of personal video recorder set-top boxes serve just as well?

60 The Success Of Google+

Wait... What? Google+ a success? Well, it's certainly still going, and with Google incorporating it into more and more of its services, can it really ever fail? James Hunt provides his own views on the matter

64 Android And iOS Ereader Apps

Didn't get the Kindle, Kobo or Nook you wanted for Christmas? Take a look at this guide to best ereader apps for Android and iOS smartphones and tablets. You may decidethat you have what you need already

70 iOS Fitness Apps

If Sarah has managed to convince you that you're okay to rely on your smartphone as a personal trainer, it's time to read Kier Thomas' guide to the best Apple-based options

Also In This Issue...

31 Component Watch

James checks out some high-end monitor options

74 Remembering...

Crash Magazine and the genius of all those that sailed in her

75 Frustrations

Sarah solves some problems with blogging staple WordPress

92 Back Up Your Drivers

Ask Jason is taking a week off, and in its absence we've been looking at keeping your computer drivers safe

95 App Of The Week

David Hayward plays around with some very special QR codes

Reviews

- 38 AOC G2460PG Nvidia
- 39 G-Sync Monitor
- 39 Synology DiskStation DS415+
- 40 Enermax EMK5402 & EMK5201U3 Drive Racks
- 41 Adata Premier SP610 512GB SSD
- 42 Transcend DrivePro 100
- 44 World Of Tanks Blitz
- 45 Transcend JetFlash 790W USB Flash Drive

Group Test

Soundcards

- 46 Asus Xonar DS 7.1
- 47 Creative Sound Blaster Recon3D PCI-E
- 48 StarTech 4-Channel
- 49 Likeow Profile
- 49 Sweex 5.1 PCI
- 50 Asus Xonar Essence ST
- 51 Creative Sound Blaster ZxR PCI-E

Experts

Ask Aaron

Specialists

- 76 Linux Mart
- 77 Mac Mart
- 78 Mobile Mart
- 79 Retro Mart
- 80 Gaming Mart

News

- 30 Your Letters
- 32 The Latest News

Regulars

- 54 Subscriptions
- 82 Ad Index
- 84 IT Essentials
- 86 Classifieds
- 96 Logging Off

SAVE A BUNDLE

Subscribe to Micro Mart today and save 24% on the shop price.

Call 0844 844 0082

Basic annual rate

UK: £77.50

Europe: £185

Rest of World: £340

Online subscriber service
Change your address and renew your subscription at

www.subsinfo.co.uk

Email:

micromart@servicehelpline.co.uk

NEW YEAR SALE!

MASSIVE MORGAN BARGAINS • EXTRA NEW YEAR DISCOUNT!

MorganComputers

**31 years of outstanding
value and customer service!**

From a small 2nd hand camera shop on Tottenham Court Road over 30 years ago, MorganComputers is now a national service mail order company serving thousands of customers from home users to large schools, colleges and businesses! We are specialists in Computers, Laptops, Tablets, Gadgets, Printers, USB & Camera Memory as well as Cameras and much more. Our stock comes from end of line, surplus stocks, bankrupt stock auctions and a huge range of top quality refurbished and graded kit. All with full warranties and a professional attitude delivered quickly anywhere in the UK!

with savings of up to 70%!

**BUY IN CONFIDENCE!
AND SAVE A FORTUNE!**

SUPERB TRANSFORMER BOOK T100



Part
Code:
41898

The laptop that transforms into a tablet! with stunning QuadCore Intel processor, 32GB SSD, Windows 8 and Microsoft Office 2013!



- Intel Atom Z3740 QuadCore 1.33GHz Processor
- 2 GB RAM • 32GB eMMC
- 10.1" 16:9 IPS HD (1366x768) with Multi-Touch Screen
- Wi-Fi • Bluetooth™ V4.0
- Card reader (Micro SD)
- 1.2 Mega Pixel webcam
- USB 3.0 port • Windows 8.1 OS

£269.95 NOW ONLY

**INCLUDES MICROSOFT
OFFICE 2013 H&S ED**



Part Code: **41820**

HP 8000 ELITE SPECIAL!

Now with an incredible 8GB DDR3 RAM, a Massive 1TB HDD, WiFi and a 1GB Graphics card the reliable and powerful 3.0GHz Core2Duo Intel processor will make short work of most tasks!

- Intel Core 2 Duo E8400/3 GHz (Dual-Core)
- 3.0 Ghz • 8GB RAM (installed)/16 GB (max)
- 1TB - SATA • DVD/CD • Stereo Sound
- Network: Wi-Fi & Gigabit LAN • Asus G210 Graphics
- Ultra Small: 33.8 cm x 37.9 cm x 10 cm
- Windows 7 Professional Operating System

TOP SPEC! LOW PRICE!



£249.95 NOW ONLY

THE "INSTANT ON" ACER CHROMEBOOK!



It's a Netbook, a laptop and a tablet! Take the best elements of each. Add the speed and safety of Google and it's amazing apps library. Remove the clutter of a Windows OS! Wrap that in a thin, light, small and FAST chassis!

ACER C720 11.6"
chrome

NEW LOW PRICE!

- 1.40 GHZ Intel Celeron Dual-Core processor
- 2GB RAM, • 16GB SSD Drive
- 11.6" Active Matrix TFT Colour LCD screen
- Hi-Resolution 1366 x 768 Screen Mode
- Wi-Fi • Bluetooth 4.0 + HS • HD Webcam
- 1 x USB 2.0/ 1 x USB 3.0 Port • HDMI Port
- Google Chrome Operating System

acer
Part Code:
47352

£149.95 NOW ONLY

TOSHIBA R930 i5 POWER LAPTOP!



Ultra thin and light laptop with the latest Intel® processor and up to 9 hours battery life!

- Intel i5-3320 2.66GHz Dual Core
- 33.8cm (13.3") , Toshiba HD non reflective High Brightness display with LED backlighting • 4Gb RAM
- 640 GB Hard disk • Wi-Fi H Black magnesium chassis with brushed metallic finish • Intel HD Graphics
- Up to 9h battery life • Only1.50 kg

BARGAIN!

£379.95 NOW ONLY

Part
Code:
41856

E&OE. All trademarks are acknowledged. Prices are subject to change without notice. Our terms and conditions of trading apply. Copies are available on request.

All Prices
include VAT

Morgan

www.morgancomputers.co.uk
Or call our FREEPHONE line: **0800 008 7451**

All Prices
include VAT

AMAZING MICROMART EXCLUSIVE NEW YEAR OFFER!

amazon kindle BARGAIN

AMAZON KINDLE FIRE HDX 7"

**Blazingly fast 2.2Ghz Quad Core Processor,
2Gb RAM, 16Gb storage and 3G/4G!**



**QUAD
CORE!
POWER!**



Instantly watch anytime on your Kindle Fire. Buy or rent from a huge selection of more TV episodes and Films than all TV channels put together. Subscribe to Prime and enjoy unlimited streaming of thousands of popular films and TV shows from Britain's largest subscription streaming service.

- Quad Core Processor
- Stunning HD display
- 1920x1200 HD Res
- 4Gb RAM/16Gb Storage
- Wi-Fi, Bluetooth, 3G/4G
- Fast web browsing
- Fire OS Mojito OS
- Front-facing camera

**CURRENT
ARGOS PRICE**

~~£259.95~~ £269.95

**CURRENT JOHN
LEWIS PRICE**

~~£259.95~~ £269.95

**LIMITED
TIME
OFFER!**

**NOW
ONLY! £169.95 ONLY**

ONLY WHILE STOCKS LAST!

Part Code:
41815

E&OE. All trademarks are acknowledged. Prices are subject to change without notice. Our terms and conditions of trading apply. Copies are available on request.

All Prices
include VAT

Morgan www.morgancomputers.co.uk
Or call our FREEPHONE line: 0800 008 7451

All Prices
include VAT



38

BRILLIANT TIPS AND TWEAKS TO GIVE YOUR PC A BOOST

Need to speed up a sluggish PC and get just a little more life out of it? **Aaron** shows you how

It's the time of year when many people choose to upgrade PCs, with a lot of owners using Christmas as a way to obtain new hardware. Whether you're buying the new parts with money or gift cards from generous friends or relatives, or you're simply planning to make the most of the end of year sales, there are many ways to add new kit to your trusty computer to give it an extra bit of power.

Of course, this won't be the case for everyone. Festive period or not, upgrading a PC can be an expensive proposal, which is an expense many simply can't afford. This kind of upgrade also requires knowledge of PC hardware and the ability to remove the old parts and install the new ones. Again, not everyone meets this requirement, so this technical hands-on route to keeping an old, ailing PC alive and kicking isn't really an option.

Luckily, there are other ways to give a PC a much needed boost, without the need to spend more money or learn the required hardware skills. It's these tips and tweaks we're going to look at here, as we delve into 38 great tips and tricks for getting a speed boost out of your current PC. We're going to be focusing on Windows 8 here, but many tweaks will also relate to older versions of Windows, so don't be afraid to have a go if you're using a different OS.

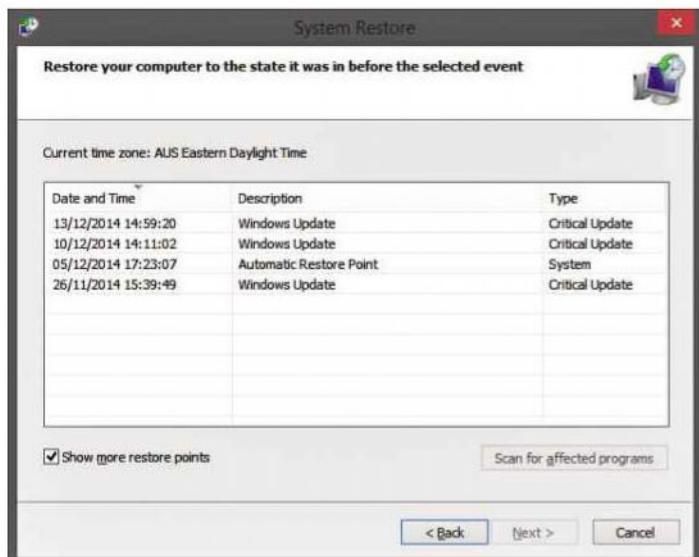
Preparations

Before we actually look into the tweaks themselves, we should do a little housekeeping and get ready for the changes we're about to make. This means we need to safeguard your data, make a system-saving backup should things go wrong and have a look at how some of these tweaks are actually done. We'll begin with your data.

Tweaking a system to gain more speed often includes making changes to the way your PC runs and tweaking system settings you'd otherwise shy away from. Although this is largely safe and shouldn't cause any issues if done correctly, there is an element of danger here, and you can upset the status quo of your system. Because of this, we always recommend you back up your important data, either to an external hard disk, optical media or cloud storage service. Whichever method you prefer to use to save your data, ensure you use it before you make any major changes.

With your data safe, you should also think of making a System Restore point. This will take a snapshot of your PC in its current, fully working state, which can be returned to if needed. So if you

make changes that cause your PC to become unstable, this will be a quick and easy reset option for you to use.



▲ Always create a new System Restore point if you plan to play around with important system settings

As for performing some of these tweaks, some are handled by simply changing Windows' settings, which is easy enough, but others may require the use of the system registry. This is a vital aspect of Windows and is a database of keys and values that contain all sorts of important information, from locations of programs and save files, to settings for deep system-level functions. It's one of the best ways to implement changes to boost your system, but it's also a potential danger, as the wrong change can cause problems, so always use caution when fiddling with it.

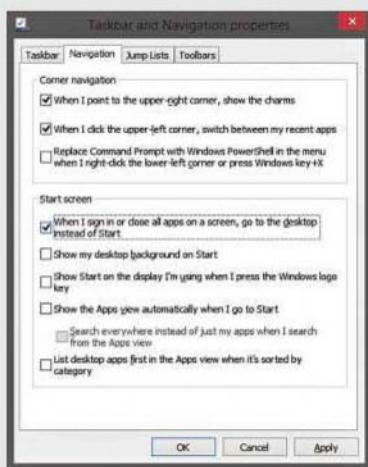
To actually get to the registry, all you need to do is press Windows+R, and in the text box type 'regedit'. When you press Enter, the registry editor will open. This presents you with a list of keys and values, which are collected together in a hierarchical tree structure. By expanding each node, you'll drill down further and further into the registry's settings. The right-hand window shows any values a selected item contains, and it's here where you can make changes to existing values or add new ones using the Edit menu or by right-clicking.

01

Boost To Desktop

We'll kick off with a simple one, and that's to bypass the default Metro boot screen you see when you load into Windows. If you're one of the many people who dislike this, and you have Windows 8.1, you're in luck. Microsoft heard people's cries, and added a way to bypass this and go straight to the desktop.

To do this, simply right-click the Taskbar and select Properties. Under the Navigation tab, tick the option 'When I sign in or close all apps on a screen, go to the desktop instead of Start', and click Apply. Now, when you boot up your PC, you'll be taken directly to the desktop.



Windows+S	Open the Search charm to search Windows and the web only
Windows+W	Open the Search charm to search settings only
Windows+Z	Show the commands available in an open app
Windows+spacebar	Switch input language and keyboard layout
Windows+Ctrl+spacebar	Change to a previously selected input
Windows+Tab	Cycle through recently used apps
Windows+Ctrl+Tab	Cycle through recently used apps
Windows+Shift+Tab	Cycle through recently used apps in reverse order
Windows+Shift+period (.)	Snaps an app to the left
Windows+period (.)	Cycle through open apps
Esc	Stop or exit the current task

02

Shortcuts

Windows has always had an array of useful shortcut key combinations that can save a lot of time, and Windows 8 is no different. Here are some of the most useful, including some new additions.

Key Combination	Effect
Ctrl+C (or Ctrl+Insert)	Copy selected item
Ctrl+X	Cut selected item
Ctrl+V (or Shift+Insert)	Paste selected item
Ctrl+Z	Undo action
Alt+Tab	Switch between open apps
Alt+F4	Close active item or exit active app
Windows+L	Lock PC or switch user
Windows+D	Show/hide desktop
Windows+start typing	Search your PC
Ctrl+plus (+) or Ctrl+minus (-)	Zoom in or out
Ctrl+scroll wheel	Zoom in or out
Windows+C	Open the charms menu / In an app, open commands
Windows+F	Open the Search charm (file search)
Windows+H	Open Share charm
Windows+I	Open Settings charm
Windows+K	Open Devices charm
Windows+O	Lock the screen orientation
Windows+Q	Open the Search charm to search everywhere or within an open app

03

Power User Menu

One of the most useful additions to Windows 8.1 and one that can help save a lot of time is the new Power User menu. This can be accessed by right-clicking in the bottom-left corner of the screen. From here you can do a lot of things, including shutting down the PC quickly, without having to go through multiple menus.

You can also quickly access command prompts, including admin, and select from a range of system settings and applications. It's a great tool and one that makes using your PC easier and faster, which is always nice.

04

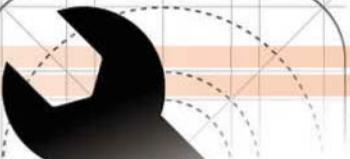
Speed Up Boot Times With Fast Start-up

Windows 8 includes a fast boot mode that can shave a lot of time off the usual start-up time. To enable this, all you need to do is Search for 'power options' and then click 'Choose what the power buttons do', which you'll find in the left-hand panel. Next, open 'Change settings that are currently unavailable' and ensure that 'Turn on fast start-up (recommended)' is enabled.

This will speed up your boot times considerably. Please note,



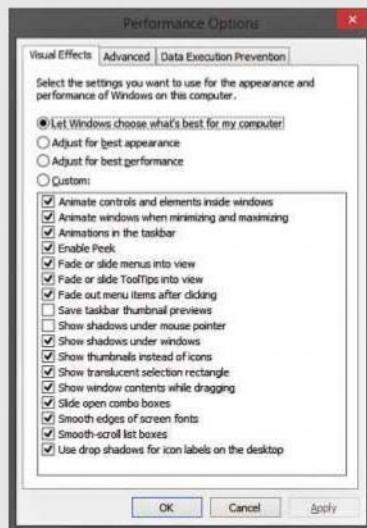
however, that this has been known to cause some problems for a small number of users, so if you experience any, you may want to disable it.



05 Disable Animations

Over the years, Microsoft has added all sorts of visual tweaks and tricks to Windows in order to improve the overall appearance, but these can often cause a bit of slowdown, so you may want to disable some of them.

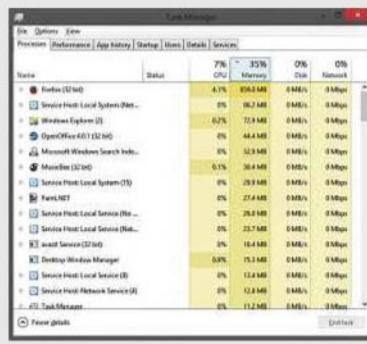
To do so, right-click Computer and select Properties and go to Advanced System Settings, then click Settings under the Performance section. Here you can trim down the various animation and visual effects. In particular, uncheck the minimise and maximise animations and fades for menus.



06 Trim Down Resource Hogs

All programs on a PC use resources, but some use more than others, and these can contribute more than usual to a slow PC. To find out which programs are using more resources, open the Task Manager (Ctrl+Alt+Del and select Task Manager). Here you'll see the currently open programs, processes and services, with the high-resource users being highlighted. You can also filter items by clicking in the heading of each column.

Using this information, you can see what's going on, and in many cases, you can close or replace a resource hog with an alternative.



07 Clean Up Your Desktop

One of the most straightforward tips to speed up Windows doesn't involve tweaks or registry hacks; all it needs is a bit of care and attention. Specifically, it needs a bit of a tidy up for your desktop.

If you have a lot of items, shortcuts, folders and programs on your desktop, your PC will most likely suffer, and performance will drop, especially boot times, as Windows needs to map each and every item on the desktop as it starts, adding to the time it takes to load your user profile. It's a simple issue and one that's often overlooked or ignored.

Spend a little time and clean up your desktop, ensuring you keep it as clear as possible. If you need to store items on the desktop, pop them into a folder instead. This way you only have one item on the desktop (the folder) instead of many.

08 Consider Windows' Own Security

Although many would argue that Microsoft and Windows' own security applications are inferior to third-party applications, and in many cases this may be correct, there's no denying that these third-party apps do use a ton of resources.

Anti-virus apps and firewalls have to be active and running constantly, which takes a lot of power and resources. Windows has some built-in tools that can help here, such as the Windows Firewall, and you can opt to use Windows Defender, which is a decent anti-virus app that uses far fewer resources than most.

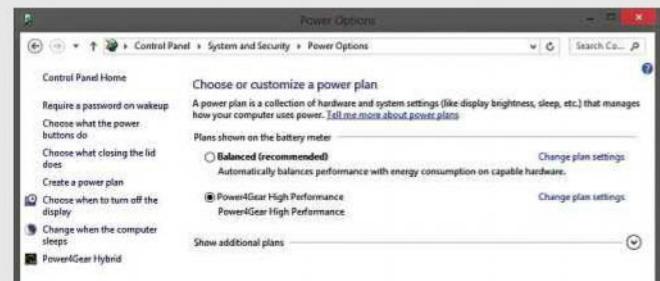
These apps can be surprisingly effective, and using them means you're not having to use third-party programs that take the lion's share of your system's resources.



09 Change Power Settings

Windows' power saving options are a great addition for users who want to save money and reduce the PC's power usage, but this can come at the cost of speed and performance. The default 'Balanced' power mode automatically reduces the CPU speed in order to save power, which will result in a slower PC when Windows deems less power is needed.

To stop this you may want to use the high-performance option, which leaves the CPU running at full pelt all the time. To do this, go to Control Panel and into System and Security and then Power Options. Now pick the High Performance option. If you're using certain hardware, you may have different options, such as the Power4Gear options seen here. Whatever options you have, select the higher performance modes to ensure the best overall speed. Obviously, this will use more power.



10 Use Sleep Mode

Windows' Sleep Mode is notorious for causing people problems, but when it works, it can be a great feature. Microsoft is clearly wanting to use the mobile computing approach of putting devices to sleep rather than powering them off, which does have its uses. Doing so doesn't actually close applications or Windows; it simply puts them to sleep. On returning to the PC, you can start it and all of your programs instantly, thereby saving a lot of time.

Mi DesignMi...

The only tablet stand you will need.

MiStand

"...fluid 3D motion allows you to adjust your tablet to an angle that suits you..."

Use **MiMicro14** @
www.DesignMi.co.uk
for **10% off!**

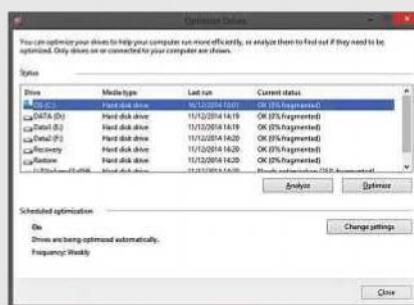
11

Defrag

Yes, it's an old but also very gold method of giving your PC a boost, and although Windows 8 is much better at optimising hard disk usage, defragmenting is still a great way to give your PC a new lease of life.

By defragmenting your hard disks every couple of months or so you can ensure all of your data is organised properly, which will facilitate better speeds when accessing data. The change after a defrag can be very noticeable, but don't do it too often or you'll wear out your hard disks faster than normal.

To find this tool, right-click a drive in Explorer and select Properties. Go to the Tools tab and then select Optimize. Here you can analyse each volume, and Windows will tell you if it needs to be defragmented or not. This process can take a very long time, depending on the size of the drive, so allow plenty of downtime, as it's best not to use the PC while the defrag procedure is running.



12

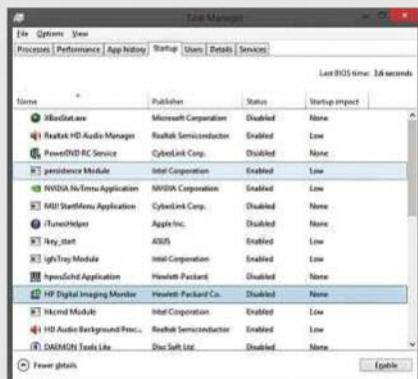
Take Control Of Your Start Up

One of the biggest causes of a sluggish system is a hefty start-up list. The more programs that boot up with your PC, the slower it'll be, at both boot time and while running, so it's a good idea to trim down this list, which is easy to do.

Windows 8 doesn't handle this via msconfig, as previous versions of Windows did, but instead uses the Task Manager, so open it up and then click the Startup tab. Here you'll see all of the programs that boot with your PC, as well as a basic start-up impact rating. Use this to trim down your start-up list by right-

clicking an item and selecting Disable (or highlight an item and click the Enable/Disable button).

The less you can have start with your PC, the better, as this will speed up boot times and leave more resources free for you to use.



13

Tweak The BIOS

Your system BIOS (now UEFI) is what controls your PC's most basic functions, and it handles your PC boot-up prior to the OS. Most BIOS versions have a range of features that can help speed up your PC's boot procedure, most notably a fast boot option.

To find this, enter your BIOS by pressing the designated key for your PC model as it boots (this is often Del, but can also be one of the F keys). Look through the options for a quick boot or something similar and enable it.

It's also a good idea to ensure your hard disk is close to the top of the boot device list. By setting this for the first device, you'll have a much faster boot. However, it's really best to keep it second in the list, with the CD ROM as first, as this is often used to boot from for troubleshooting purposes.

14

Clear Internet Cache

This is another common trick, but one that's no less important. To speed up your internet browsing, always ensure you clear out your internet cache. The more this builds up, the slower your browsing will be.

Different browsers locate their cache stores and options in different places, so have a look around the options and preference screens for the option to clear the cache. Do this every so often, and you'll notice your internet use is faster. It's also a good idea to limit the amount of disk space cache can use.

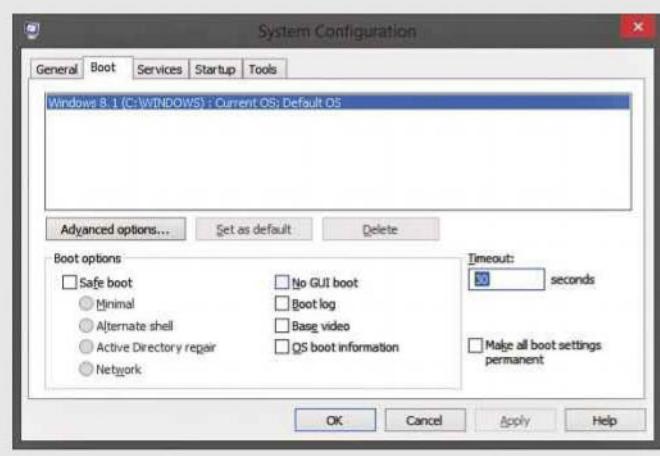


15

Trim Boot Menu Time

If you dual boot your PC with Windows 8 and another OS, you'll have a boot menu that pops up during loading that gives you the choice of OS. This has a time-out value that kicks in after no input is received. If you mostly want your default OS, then you may as well decrease this from its default time of 30 seconds.

To do this, press Windows+R and type 'msconfig'. Click the Boot tab and in the time-out field, enter a shorter duration.



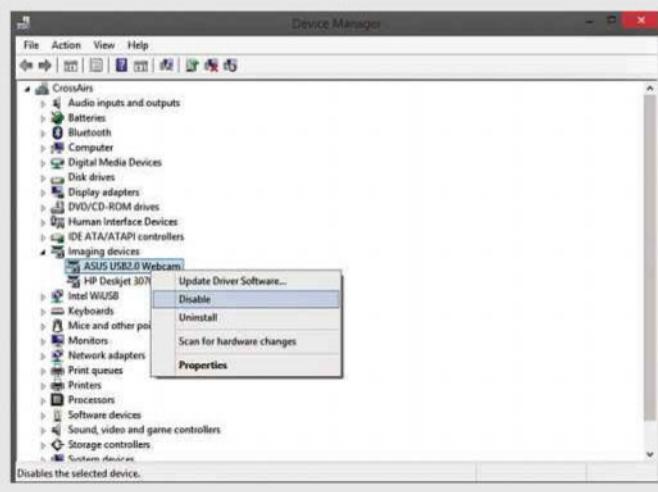
16

Disable Unused Hardware

All hardware installed within a PC uses resources, even if you don't use it. For example, you may have bought a PC with a capture card and never use it, but it'll still be taking up resources and system operations. So why not disable it until you do need it?

To do this, go to Control Panel and Device Manager. Locate the hardware you don't need to use or don't want, and right-click it and click Disable. Windows will now disable it, and it'll no longer be registered so won't take up resources.

This is a better option than actually removing the hardware, as it leaves it available for future use.



17

Update

This is more advice than an actual tweak, but it's surprising how many users overlook it. It's advisable to always keep your PC up to date, which includes Windows updates, drivers, software updates and so on. This ensures all of your hardware is running optimised drivers and Windows has all of the updates it needs. These updates often include security updates and can prevent viruses and back-door attacks that can slow down a PC.

18

Scan For Viruses And Malware

Following on from updating programs and drivers, including security software, it's also a very good idea to run regular scans with both anti-virus and malware detection applications. Malware attacks are one of the most common causes of system slowdowns, and by doing this you can ensure your system is clean and has no external threats slowing it down.



19

Clear Your Fonts

Windows can make use of an almost endless amount of fonts, and the font directory can hold masses of textual types. However, having more fonts isn't always a good idea, and too many can cause a surprising amount of slowdown. This manifests in most programs that can make use of fonts, such as text editors and image editors. The more fonts a PC has, the longer it'll take these programs to populate their font lists and menus, especially if these apps have font previews. This can mean programs take longer to load and suffer delays when in use.

To combat this you may want to take a look in your font directory and trim down the number of fonts you use, getting rid of those you'll never use. You can find the font directory in c:\Windows, and within it you can delete fonts as well as see previews, making it easier to decide which you don't want to keep.

20

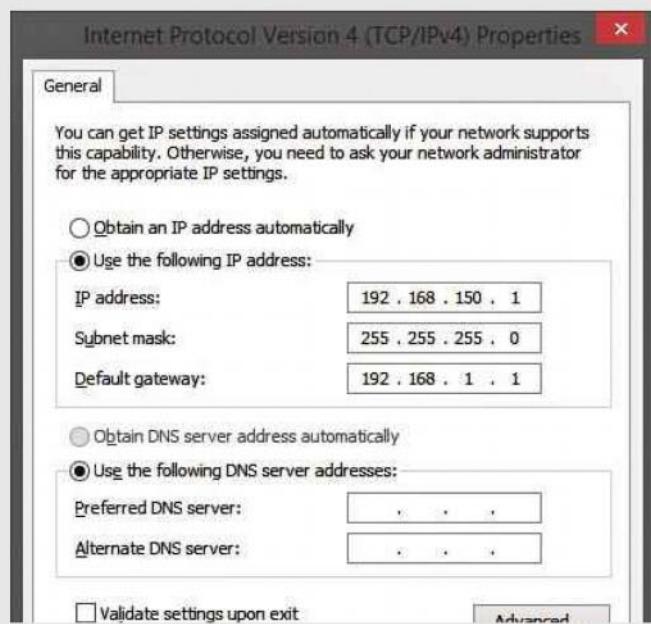
Static IP

Most users these days make use of DHCP IP addresses. This method gives your computer a dynamic IP address when it connects to the network and means you don't have to manually configure it. It's fast, and it's easy. However, obtaining an IP at start-up can also add to your overall boot time. Giving your PC a static IP can help here.

To do this, Open Control Panel and go to Network and Internet, then Network and Sharing Center. Select 'Change adapter settings' from the left, and right-click your adapter and select Properties. Look for 'Internet Protocol Version 4 (TCP/IPv4)' in the list, highlight it, and then click Properties.

Select the option to 'Use the following IP address', and enter the details that relate to your network setup (consult your documentation or ISP for this). Click OK when done. Windows should check this and let you know if everything is okay.

You'll probably need to connect to your router next, in order to reserve your entered IP address for the PC, otherwise another device could take it using DHCP. Again, consult your documentation for guidance on this.



21

Uninstall Unneeded Applications

This is another simple and often overlooked step to take, but removing unwanted programs can do your PC a world of good. Every program on your PC takes up disk space and some resources, so removing any you don't use will always help, especially large programs, such as games.

Regularly look through your programs list and trim down the fat to keep your PC slim and speedy.

22

Stop Windows Update From Rebooting Your PC

It's not a speed tweak in the truest sense, but we've all been set back, sitting there for ages while your PC automatically reboots after an update. In some situations, Windows have even done so with no notice, causing even more problems. Therefore, you may want to prevent this.

To stop Windows rebooting itself, we need to use the Group Policy Editor (not available in Home versions). Open it by typing 'gpedit' in the Windows+R run box and pressing enter. When it's open, navigate to Computer Configuration\Administrative Templates\Windows Components\Windows Update. Now look for the entry 'No auto-restart with logged on users for scheduled automatic updates installations' and double-click it. In the new window, click the radio button to enable the option and click Apply.

Next, we need to force the new policy, so press Windows+R and type 'gpupdate /force' and press Enter. This will enforce the new rules right away.

If you don't have access to the Group Policy editor, you can still get the same results using the registry. Open up the editor and HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Microsoft\Windows\WindowsUpdate\AU (you may need to create these). Here, create a new DWORD (32-bit) value and call it 'NoAutoRebootWithLoggedOnUsers'. Give it a value of 1 and close the registry editor. That's it.

23

Clean Up Context Clutter

The right-click context menu in Windows can make accessing things far easier and faster, but as it fills up with options (added by many programs), this menu can become sluggish and take a while to even open and populate. If this is happening to you, you may want to trim it down to the options you actually need.

To do this, we can use the registry, but entries for the context menu are spread around and not in a single location, which makes it a little more difficult.

To begin, open the editor. The values we need are found mostly in a handful of locations. File and folder entries are usually found in the following locations.

HKEY_CLASSES_ROOT*\shell

HKEY_CLASSES_ROOT*\shell\shelllex\ContextMenuHandlers

HKEY_CLASSES_ROOT\AllFileSystemObjects\ShellEx

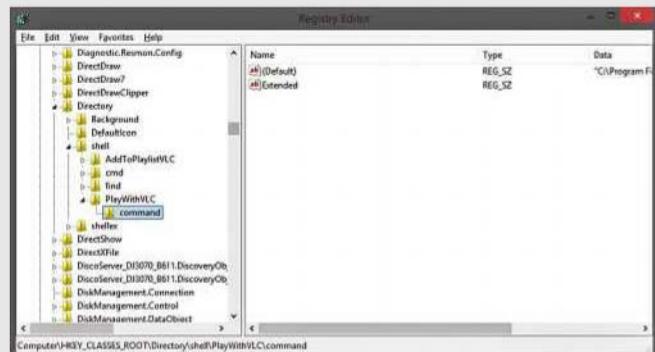
There are also other specific locations, which can be found in the following locations.

HKEY_CLASSES_ROOT\Directory\shell

HKEY_CLASSES_ROOT\Directory\shelllex\ContextMenuHandlers

These values can be handled differently, so care must be taken. We'll look at Shell items first.

To remove an item, you can simply highlight it and delete it, but you may want to take another, less permanent approach. Shell items can be easily hidden or added to a shift-click menu by adding a simple string value. To move the shell context menu entry to a shift-click menu, add a string value called Extended. To disable it without deleting it, add a string value called 'LegacyDisable'.



24

Add Programs To Context Menu

If you actually want to add items to the context menu to speed up your PC use, you can, and this is also handled by the registry. To add an item (we'll use the registry editor itself for this example), open the editor and navigate to **HKEY_CLASSES_ROOT\Directory\Background\shell**.

Right-click Shell and select New > Key and name the key what you'd like to appear on the context menu. Here we've used 'Open Regedit'. Next, right-click the new value and add another new key, and call it 'command' (lower case).

Next, locate the .exe file for the item you wish to add to the context menu and then hold Shift and right-click it. Select 'Copy as path' and return to the registry editor. Double-click the '(Default)' value in the right-hand window (with the new 'command' key still highlighted), and in the empty box, paste the path to the .exe. Close the key and the registry editor, and the item will now be added to the context menu.

25

'God Mode'

It might not endow you or your PC with divine powers, but this little trick can certainly make your life easier and make accessing various PC settings and features significantly faster. By creating a custom icon and using the right command, you can have access to a mass of options with a simple double-click.

To do this, right-click on the desktop and select New > Folder. Name it '**God Mode.{ED7BA470-8E54-465E-825C-99712043E01C}**' and press Enter. Once you do this, the icon will change to a Control Panel icon. When you double-click this, you'll have access to a whole collection of system tools and options.



"The FUZE is what
the Raspberry Pi
was designed for"



FUZE Type II

The Ultimate Case for Raspberry Pi B & B+



The Register®

theresister.co.uk

...and then there's the FUZE, which takes Pi packaging to a whole new level of functionality"

...makes the Pi more accessible than ever
PC PRO Recommended

... it's certainly the **best** we've **ever** tested.
micro mart EDITOR'S CHOICE



**FUZE T2 SE
Special Edition
Also available**

The FUZE T2 from

£69.99

fuze.co.uk

Protect your Pi from physical & static damage

UK keyboard* & 4 Extra USB ports

FUZE I/O Board with GPIO pass-thru

Clearly labelled input output ports

2 Amp power supply and on/off switch!

Adds analogue ports, 4 in & 1 out



* USA & German keyboard layouts are also available.
Prices include VAT but not shipping - see fuze.co.uk for details
©2014 FUZE & the FUZE logo are trademarks of FUZE Technologies Ltd.
Raspberry Pi and the Raspberry Logo are trademarks of the Raspberry Pi Foundation and are used with permission. All rights reserved.

FUZE Technology Ltd - www.fuze.co.uk
+44 (0) 1844 239 432 - contact@fuze.co.uk



26

Open Command Prompt Here

Unless you've been a computer user for many years and have first-hand experience of using DOS and the command prompt, it can be difficult navigating around your PC using the text-only interface. Unfortunately, this is sometimes needed, so it can present a problem for many. A simple tip can make this far easier, though, and it's one that's easy to use but also easy to miss. Using it you can open any location instantly in the command prompt.

To do this, all you need to do is simply locate the location you need to access in the command prompt within Windows Explorer. For example, let's browse to the Windows System32 folder. Now, hold Shift and right-click the System32 folder. From the menu select 'Open command window here'. A new command prompt will open, and it will already be at the required location. Easy and a lot faster than getting there manually by typing in commands.

27

Trim Open With

The right-click open with option is very useful, but like any context menu entry, it can also be slow if populated with too many options, so trimming this down can help speed things up a little. This requires a bit of registry tweaking, so open it up first.

Navigate to **HKEY_CURRENT_USER\ Software\ Microsoft\ Windows\ CurrentVersion\ Explorer\ FileExts**. Locate the extension for the file type which you'd like to remove program associations for and expand it. Once you click it you'll see some data on the right, including the names of programs that have been registered to open the file. To trim down the 'open with' menu, simply delete the options you don't want.

For example, you might have MP3 files and have many apps attached to them. If you no longer wanted to have the option to open these music files with iTunes via open with, you would simply delete the relevant entry.

28

Delay Your Services

Disabling Windows services is often cited as an effective method of streamlining a PC and gaining better performance, but doing so is a double-edged sword. Although you might gain more speed, you'll also lose whatever functionality the service delivered. In some cases, disabling some services can even cause problems.

So instead of disabling a service, it may be a good idea to simply delay its start-up. This means Windows will still boot up faster, but you'll also have the service active and usable. To do this, open the Services window by pressing Windows+R and typing 'services.msc'. Select the service to be altered, then right-click and select Properties. In the Startup type window, select 'Automatic (Delayed Start)'. This will boot the service, but after Windows.

This is best used for low resource usage options, as services like Windows Search is a constant resource drain, which is best disabled if you don't need it.

29

Disk Cleanup

Windows Disk Cleanup tool, like Defrag, has been with us for a long time, and its usefulness is still just as apparent in terms of PC speeds. Over time, your hard disk will collect all sorts of unwanted data, cache and temp files, and these can take their toll on your system's data access speeds.

Using the Disk Cleanup tool lets you scan for this unneeded data so you can clear it all out and claw back some access speed. To do this simply open Explorer, right-click the drive to clean and select Properties. You'll see the Disk Cleanup button below the capacity pie chart. Click this, and Windows will analyse your drive, and you'll then be able to select items to remove, thus giving you more space and a speedier system.

30

Auto End Tasks

When applications or services in Windows experience problems, they can often become unresponsive, but Windows won't always deal with them quickly. In situations like this, programs can sit there in a hung state, causing system slowdown and other problems.

Using a selection of registry tweaks, however, you can force unresponsive programs to shut down, making for a faster system. To begin, open the registry editor and navigate to **HKEY_CURRENT_USER\ Control Panel\ desktop**. Once here, you'll need to create a few new string values within the Desktop folder. Create a new item for each of the following, ensuring you specify each value.

Name	Value
AutoEndTasks	1
HungAppTimeout	1000
WaitToKillAppTimeout	2000
LowLevelHooksTimeout	1000

31

Ignore Broken Shortcuts

Windows is an intelligent system, but it can also be very stubborn and can allocate resources to pointless tasks. This includes searching from programs that no longer exist at the end of an old shortcut and resolving old shortcuts that are no longer in use. With a few simple registry values, you can prevent this. As with the Auto End Tasks tips, you'll need to create these manually.

Navigate to **HKEY_CURRENT_USER\ Software\ Microsoft\ Windows\ CurrentVersion\ Policies\ Explorer** and then create the following DWORD values.

Name	Value
LinkResolveIgnoreLinkInfo	1
NoResolveSearch	1
NoResolveTrack	1

32

Kill Unresponsive Services Faster

Windows services are very important and run in the background, handling all sorts of essential functions. However, like programs, they can become unresponsive and can cause system instability, as well as performance hiccups. Therefore, a quick tweak to end these unresponsive services faster is helpful. Luckily, there is one, and here it is.

Simply navigate to **HKEY_LOCAL_MACHINE\ SYSTEM\ CurrentControlSet\ Control** and create a new string value named 'WaitToKillServiceTimeout', and give it a value of 2000. That's all there is to it.

33

Single Click Stacking

Windows 8 has a hidden option to stack open Windows on the Taskbar with a single mouse click. This makes it easier to find items, and because fewer previews are visible on screen, it also saves on resources.

To enable this, open the registry and go to **HKEY_CURRENT_USER\ Software\ Microsoft\ Windows\ CurrentVersion\ Explorer\ Advanced**. Next, create a new DWORD value called 'LastActiveClick' and give it a value of 1. Done.

34

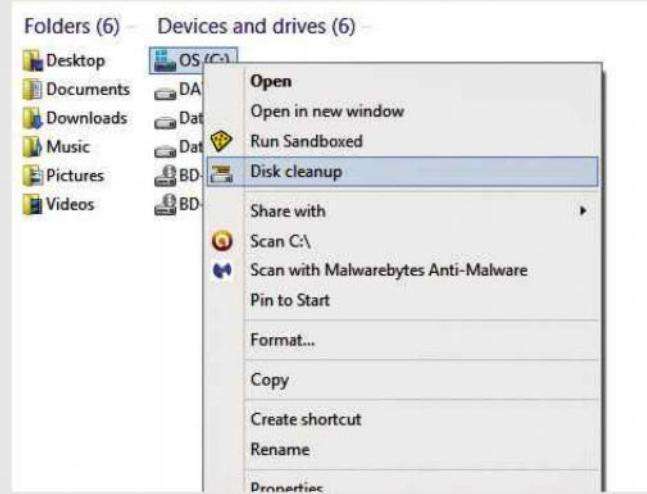
Disk Cleanup On Context

We've already looked at running Windows' Disk Cleanup, which can be a great help in speeding up the PC. Well, if you need to use this more often, you may want to make it easier to access, and one way is to add an entry to the context menu when right-clicking drives in Explorer. This can be done with, you've guessed it, a quick registry tweak.

First, navigate to **HKEY_CLASSES_ROOT\ Drive\ shell** and create a new key called 'Disk cleanup'. Now, in this key create a new string value called 'icon' and set the value to 'cleanmgr.exe'.

Next, create a key under Disk cleanup called 'command'. Edit the 'default' value, and set the value data to 'cleanmgr.exe /d %1'.

Once this is done, you'll see an option for 'Disk cleanup' in the right-click context menu.



35

Add Domains To Search

You can quickly speed up your internet use by enhancing an already useful feature of Internet Explorer 11. By default, simply typing in text in the address bar will generate possible matches, and these include results from four preset domains, including .com, .net, .edu, and .org. You can, however, add more to this list.

To do this, open the registry editor and navigate to **HKEY_LOCAL_MACHINE\ SOFTWARE\ Microsoft\ Internet Explorer\ Main\ UrlTemplate**. You'll see the existing string values for the default domains, and to add more, simply add a new string value, with the name being the next incremented number and the value being the domain, prefixed by 'www.%s.'

So to add .co.uk and .gov, you'd add 5 and 6, with the values 'www.%s.gov' and 'www.%s.co.uk'.

36

Speed Up Taskbar Preview

A useful feature of Windows 8 is the taskbar preview. This lets you view a small preview of each program by simply hovering over an item on the taskbar. This may take a little too long for some, though, and you may want to speed it up a little.

To do this, open regedit and navigate to **HKEY_CURRENT_USER\ Software\ Microsoft\ Windows\ CurrentVersion\ Explorer\ Advanced**. Under this key, create a new DWORD value called 'ExtendedUIHoverTime' and double-click it. Set the value to 400. Now, once your PC is rebooted, previews should show up faster.

37

Increase Menu Speed

Menus in Windows can take a little time to open, which is by design in many cases. You can speed things up using the registry if you like. Open it up and navigate to **HKEY_CURRENT_USER\ Control Panel\Desktop**. Here, find the entry called 'MenuShowDelay' and change its value to 400. Simple.

38

Windows Indexing

Windows' indexing feature scans your PC automatically for any changes to files and facilitates faster file searching. This can be very useful if you often use the Windows search feature to find items, but if you don't, you can gain a speed boost by disabling this.

To turn off this feature you can deactivate the Windows service for it. To do this press Windows+R and type 'services.msc' and press Enter. In the Services window, locate the entry for Windows Search and right-click it and select Properties. Set the Startup type to Disabled. This will disable the service and stop the auto indexing.

Of course, losing Windows' search function may be a bit overkill, and instead you may wish to keep it but limit what it does. To do this, search for 'Indexing Options' and run it. Here you can control the files and folders that are indexed and limit what the service handles. So you can keep the functionality, but by limiting what it does, you'll use less resources. **mm**

Whatever Happened To The 3D Printing Revolution?

3D printing was supposed to change everything. So what's happening? Sarah Dobbs investigates

This time last year, 3D printing seemed poised to take off. Specifically, consumer 3D printing seemed like it was about to become a thing: tons of consumer grade 3D printers were being launched, each more compact and cheaper than the last, and high street electronics stores like Maplin and PC World were starting to stock them.

It's 2015 now, and the vast majority of us still don't have 3D printers in our homes – indeed you probably don't even know anyone who does or who plans to in the near future. Did the 3D printing revolution stall? What happened to the shiny new future where we'd all be printing spare parts and inventing toys at home?

The Hype Cycle

The media buzz around 3D printing started in mid-2011. The technology wasn't new then, exactly – the first 3D printers were invented in the 80s – but some key patents relating to fused deposition modelling (FDM) techniques expired in 2009, prompting a cascade of lower cost devices. With companies such as RepRap and MakerBot creating relatively cheap, accessible printers, the future seemed bright.

The enthusiasm of the maker movement saw lively online communities pop up around 3D printing, and the mainstream press started to pick up on the possibilities. As design software was also becoming cheaper and accessible too, 3D printing potentially meant that anyone could design whatever they wanted and create it as a physical object, without having to ask permission or invest huge amounts of money. Amazing!

Except, it seems, like we'd jumped the gun a bit. Analytics firm Gartner uses a diagram it calls the Hype Cycle for emerging technologies, and it's something that happens with pretty much any new innovation. Each cycle kicks off with a new idea or invention, swells as everyone gets excited about the new thing, then plummets into a 'trough of disillusionment', as it turns out the new technology wasn't quite ready to be as brilliant as everyone thought it was after all. After that, there's a slower rise in perception of the technology until it becomes useful and every day. The end of 2013 and beginning of 2014 saw expectations for consumer 3D printers soar skywards – and then, as 2014 progressed, the disappointment set in.

Money, Money, Money

Part of the problem was money. Although the new generation of consumer 3D printers are touted as 'affordable', they still cost upwards of £500 for the most basic models. Let's be honest, £500 is a lot of money to spend on a new gadget, when you could get a pretty decent laptop for that – with change left over for a tablet, probably.

If you wanted a more impressive 3D printer, you're looking at spending around £2,000 – and

ASDA 3D YOU

Now anyone can be a model!

From £49 Book Now



- Scanning takes just 12 seconds
- Quality ceramic model - up to 7"
- Great if loved ones work away
- Make unique wedding cake toppers
- Captures a special moment in someone's life

All in 4 easy steps:

1

Select your nearest store and model type

2

Choose your preferred date and time

3

Scan in-store and pay when you're happy*

4

Choose to pick up in-store or deliver home in 21 days

Find your nearest store

Enter your postcode or nearest town
Leeds

ASDA York

24.7 miles away

Book Now

Choose another store

Choose another store

Choose your model

Child (up to 6')	£49
Adult (up to 7')	£59
Two children (up to 8')	£85
Adult & baby in arms (up to 2')	£95
Two adults or adult & child (up to 7')	£115
Trio incl. two adults and baby in arms (up to 7')	£125
Costume (e.g. coat of arms)*	£120
70mm base	£7

when you're spending that much money on something, you want it to be brilliant. So when the reality is a slightly fiddly machine that needs some tuning and can still only produce smallish plastic figures that need work to look finished... well, that's pretty disappointing.

For most people there aren't really many obvious uses for a 3D printer in their everyday lives. Once you've printed a chess set and a Christmas decoration and some other bits and pieces, you're going to need to have a lot of time and imagination to spend on thinking up more elaborate or inventive prints. There are, obviously, loads of makers and tinkerers out there who relish challenges like that, and a look through Thingiverse reveals all sorts of clever things people have designed and made, but it's just not the kind of thing the average person is going to be bothered with.

Patent Problems

So FDM printers haven't massively taken off this year, but 2014 was also supposed to usher in a new kind of consumer printing as several key patents for another method of 3D printing, selective laser sintering (SLS), also expired at the beginning of the year. The theory ran that, once those patents were out there, we'd see companies taking advantage to create open source (or just cheap) SLS printers, bringing higher definition 3D printing to homes. That didn't happen either.

A major hurdle is that SLS is a complicated process. Unlike FDM printing, which involves squirting melted plastic into pre-programmed shapes, SLS uses lasers to melt powders in specific ways to form into pre-programmed shapes. It's harder to create safe, cheap machines that can do it. (It'd probably be a tougher sell to prospective buyers, too; as lay people, it's pretty easy to imagine a nozzle squishing Play Doh into shapes, but harder to imagine lasers building solid objects out of sand.)

Another reason is that while some patents expired this year, there are still others protecting various parts of SLS techniques and machines. It may not be possible to build a functioning SLS printer without violating some of those. So that's a pretty major stumbling block.



66 For most people there aren't many obvious uses for a 3D printer 99

It's Not Over

Let's not get too negative, though. Just because 3D printing hasn't yet revolutionised our lives doesn't mean it's gone away completely. Actually, the opposite might be true, as Google Trends shows more results for 3D printing over the last month than ever before. It's just that the focus has shifted a bit.

Rather than continuing to push 3D printers to home users – though there are still loads on the market and more coming all the time – companies seem to be looking at industrial uses. For automotive and aerospace companies, having a machine that can turn out prototype pieces for new designs quickly and cheaply is extremely useful, even if the finished items can be created using more traditional manufacturing processes.

Speaking of aerospace, the International Space Station just took delivery of its very own 3D printer recently. The idea of a printer that could work in zero gravity has been floating around for a while, and an experimental printer, created by Made In Space, has just been handed over to the astronauts. In that circumstance, you can instantly see how useful a 3D printer might be – it's not like the residents of the space station can just nip out to Homebase to grab some tools or spare parts. Like consumer printers back on Earth, though, there

might well be issues with calibration and reliability, so it remains to be seen just how well the printer will manage to function up there.

Will.i.am's Recycling Machine

The 3D printing industry doesn't have many celebrities yet – Bre Pettis of MakerBot is probably the closest – so maybe it's not a surprise some companies are bringing household names on board to try to make their technology, well, a household name. MakerBot partnered with Martha Stewart on a series of home accessories, while 3D Systems went one better and brought in former Black Eyed Pea Will.i.am as its chief creative officer.

The partnership was announced back in January, and this summer the first fruits of the union were announced – with the Ekocycle Cube printer. It's very similar to 3D Systems' Cube printer, but it uses recycled plastic as its printing material. That creates another new angle for 3D printing – it's environmentally friendly as well as creative and techie – but so far, it still hasn't been enough to really push interest. Maybe the problem is that the recycled material the Ekocycle prints has to be bought from distributors, pre-mashed into little pellets; if you could actually save yourself a trip to the bottle bank by using your old bottles as print cartridges, that might get people excited.

Again, though, maybe it's just a matter of time. Will's association with the product definitely grabbed it some page space it might otherwise not have been granted, so maybe more celeb endorsements are in the works for 3D printers?

Printed, Not Printers

Meanwhile, back on solid ground, it seems like 3D printed objects might sell better than the actual printers, at least for a while. 3D printed toys like Makies are being stocked through major toy and department stores, putting the product rather than the process under the noses of customers; online 3D printing services like Shapeways still seem to be doing good business, with new and improved materials being rolled out on a regular basis.

You also might find 3D printing services popping up on a high street near you in future, if they're not there already. Asda started trialling 3D photo booths around this time last year, and after deciding there was enough demand, rolled out booths to a few more of their stores across the country – and the supermarket is touting its 'shelfies' (self-portraits you can stick on the shelf) as ideal Christmas presents this year. So if you're stuck for something to get a grandparent, dropping by to get 3D model of you scanned and printed might be the way forward. The prints aren't exactly cheap, though, at £49 for the very smallest versions.

It will be interesting to see how Asda fares with this service; if enough people want it, it'll end up in more stores, and Asda probably won't be the only place to get it done for much longer.

Looking Ahead

Considering the lack of visible progress in the 3D printing market this year, it doesn't seem sensible to

declare 2015 the year of 3D printing either. There are a lot of companies with a lot riding on eventual adoption of the technology, though, and even Gartner's depressing graph suggests that things will get better once we drag ourselves out of that trough of disillusionment. That means accepting that 3D printing technology as it currently stands probably isn't going to solve all of our problems and that it'll take a bit longer for things to get moving properly. When it does, though, what can we (eventually) look forward to?

Well, if 3D printing is to become commonplace, it needs to be cheaper, and it needs to be better. That sounds trite and vague, but unfortunately it's where we are: the products of 3D printing need to look better and be more accurate; the printers need to be easier to use; and the whole lot needs to not be ruinously expensive. There are plenty of 3D printer manufacturers working on that – HP actually just announced a new printer that works ten times faster than any currently on the market, though it won't actually go on sale until 2016 – so over the next few years, we should see a steady improvement in the quality of printers.

In terms of larger scale projects, NASA seems quite invested, and the UK government has pumped several million into development projects, so you'd expect to see that pay off at some point. One aspect of 3D printing lots of people want to tackle is the range of materials that can be used. Plastic is all very well, but if someone could make a reliable metal printer, that could be a

proper game-changer. It's not going to be easy, though, so patience is key.

So 2014 wasn't the year that 3D printing went mainstream, but that revolution hasn't been completely cancelled – just maybe rescheduled for 2020 or so. **mm**

The screenshot shows the Cubify website homepage. At the top, there's a navigation bar with links like 'Currys', 'Search', 'View basket', and categories such as 'Kitchen Appliances', 'Small Appliances', 'TV & Entertainment', 'Computers', 'Audio', 'Computing', 'PC Accessories', 'Mobiles', 'Smart Tech', 'Home and Office', and 'Business and Industrial'. Below the navigation, there's a large banner with the 'Cubify' logo and a colorful illustration of various 3D-printed objects. The main content area features a section titled 'Introducing the Cube 3D Printer by Cubify™' with a video player. To the right, there's a section titled 'The future is here... 3D Printing' with text about printing from a PC and a link to 'View 3D printing range'. At the bottom, there's a section titled 'Get engaged' with a link to '3D printing is revolutionising many fields...'. A small note at the bottom left says 'Download the latest issue and this week's 3D printer to MAKE magazine. You can get started straight out of the box with the Cubify simple set-up, plug it in, and it's ready to go! The Cubify is the only 3D printer that is certified as safe for home use by safety standards.'

A 3D Printing Timeline

3D printing might not have made it into your home just yet, but it's come a long way in the last couple of decades:

1983 The stereolithography (SLA) process was invented by Charles Hull.

1984 An alternative method of additive manufacturing, dubbed selective laser sintering (SLS), was developed by Joe Beaman and Carl Deckard.

1986 3D Systems was founded.

1989 The process we now tend to think of as '3D printing', fused deposition modelling (FDM) was invented by S. Scott Crump; Stratasys was founded.

1992 Stratasys created its first FDM machine, the 3D Modeler.

2005 The first open source printer project, RepRap, was founded by Adrian Bowyer.

2008 RepRap launched the Darwin self-replicating printer, and soon there were over 100 copies of it in the wild.

2008 3D printing website Shapeways was launched – in private beta.

2009 Vital FDM patents expired, causing dozens of companies to start manufacturing their own consumer 3D printers – including MakerBot

2014 The patent for laser sintering expired in January, but didn't spark a 2009-style revolution.

2015 And Beyond Who knows?

WEB HOSTING

TOP APPS NOW EVEN BETTER!

WordPress and more with 1&1!

- Easy installation with 1&1 WP Wizard
- **1&1 Expert App Support 24/7**
- Evaluation version for all applications
- Security notifications and automatic updates
- Up to 2 GB RAM guaranteed
- Optimised for WordPress and over 140 more apps (Drupal™, Joomla!™, TYPO3...)

Powerful Tools

- NetObjects Fusion® 2013 – 1&1 Edition included
- 1&1 Mobile Website Builder
- **PHP 5.6**, Perl, Python, Ruby, ASP.NET and more...

Successful Marketing

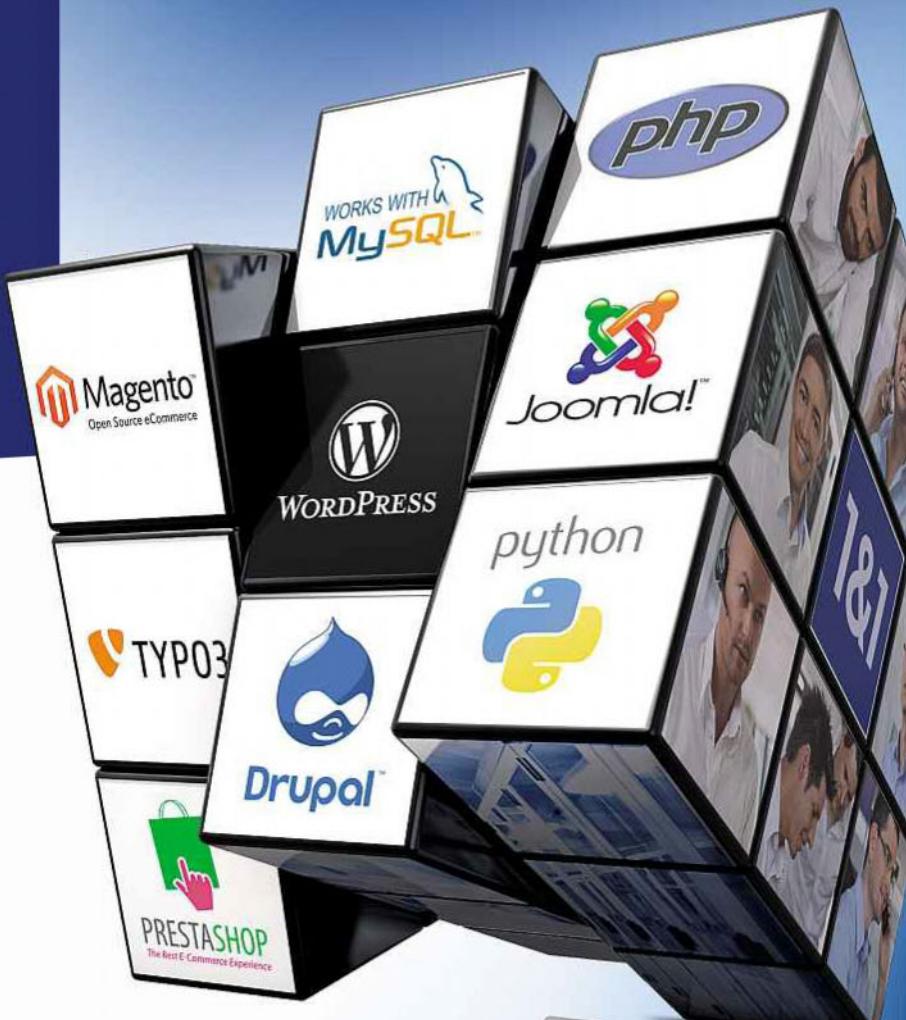
- 1&1 SEO Pro
- 1&1 Search Engine Marketing
- Facebook® and Bing® credits
- 1&1 Newsletter Tool

State-of-the-Art Technology

- **Geo-redundancy** for maximum availability
- Over 300 Gbit/s network connectivity
- 1&1 CDN with Railgun™

All Inclusive

- Free domain for package lifetime (.co.uk, .com, .net...)
- Unlimited power: Webspace, Monthly Traffic, E-mail Accounts and MySQL Databases



COMPLETE PACKAGES

Starting at
£0.99
per month*
excl. 20% VAT

0330 123 0274

* 1&1 Basic £0.99 per month for 12 months with 3 month billing cycle, paid in advance, then regular price applies. Prices exclude 20% VAT. Visit www.1and1.co.uk for full offer details, terms and conditions. Rubik's Cube® used by permission of Rubik's Brand Ltd.



1and1.co.uk



Can Your Phone Get You Fit?

Sarah Dobbs looks at the different fitness trackers available and wonders if the personal trainer's days are numbered...

It's nearly that time again. January 1st: the time when every magazine and advert exhorts you to change your life, because the number on the calendar has changed. It used to be that this time of year was for signing up to diet clubs and gyms, but nowadays you probably don't need to bother. Why pay someone else to tell you what to eat and how to exercise when you can get everything you need on your smartphone?

Over the last few years, all sorts of wearables have been launched to help us track our activity and work on getting fitter. These, too, might soon become a thing of the past as big tech companies like Google and Apple have launched their own apps that help integrate fitness tracking into phones, which means you don't even need to buy any new specialist hardware – you just download a free app or two and you're off.

Can it really be that easy, though? Let's take a look at the competing versions of phone fitness trackers.

Apple Health

We'll start with the one that seems to be attracting most attention: Apple's Health app. The recently released iPhone 6 (and iPhone 6 Plus) has a built in M8 'motion coprocessor', which collates and processes data from various sensors inside the phone. This may not sound massively exciting, but what it means is that the iPhone 6 can take information from its built in accelerometers and gyroscopes and use it to figure out what

a user's doing – how fast they're walking or running, if they're going up stairs, if they're cycling or doing other kinds of activity. The Health app, then, keeps a record of all that activity, as well as pulling in data from other health-tracking apps you might want to install, to create a one-stop health shop that can display all kinds of information about how healthy you are.

Some information you'll have to type in yourself, of course, but the Health app can track all sorts of things and then display info on whether you're getting the right kind

of nutrition from your food, whether your weight's in a healthy range and whether you're getting enough exercise. There's also a potentially extremely important section where you can enter information about any allergies you suffer from, what medications you're on and who should be contacted in case of an emergency – all of that stuff can be accessed via the Lock screen, which could be life-saving.

Health is designed to work with the Apple Watch too, which will be able to track your movements more accurately since it's more



likely to be attached to you at all times, but it's not necessary – the iPhone itself has all you'll need to become really, excessively nerdy about your health.

Google Fit

That's all very well, but what if, like many of us, you've got an Android phone instead of an iPhone? Funnily enough, there's an app for that platform too. Google Fit is its answer to Apple Health – a free app that's been around for a while, built into Android smartwatches, but is now available for all Android phones and tablets. Like Health, it uses the sensors built into your phone to capture your activity levels – the phone's accelerometer and GPS can measure how much you're moving about and presumably tell the difference between when you're running and when you're driving your car. Like Health, the app then displays all the info about what you're doing as graphs and stats. You can also set yourself goals; by default, Google Fit wants you to get in an hour of activity per day, but you can reduce or increase that to suit your own fitness goals.

Smartly, Google Fit will send you periodic reminders and nudges so, once you've installed the app, if you forget about it after the initial period of enthusiasm wears off, it'll remind you to get back on track. Also – like Health – Google Fit can sync up with other fitness apps and devices, including Nike+, Runtastic and Runkeeper, so you can keep all your stats in one place. It syncs with some brands of smart scales to track your weight, and it can also keep track of your heart rate if you've got an appropriate wearable to monitor that info. Otherwise, you'll have to enter your weight manually. There's not really much to choose between Apple Health and Google Fit – except, obviously, which phone you're already using.

The Others

Obviously Apple and Google are the major players here, but there are a couple of other alternatives.

Samsung's had its S Health app out for a while, since the Galaxy SIII launched in 2012 in fact. It started out as a pedometer and fitness tracker that gathered info from other apps, but actually got pared down as time went on, with some things like blood pressure and blood glucose tracking facilities removed in the 3.0 version. For Galaxy S5 users, Samsung offers a free 12-month membership to Endomodo Premium, plus six months' free access to Deezer Premium+ so you've got something to listen to while exercising. Perhaps sensibly, Samsung now promotes using your Samsung phone with



Making Exercise More Interesting

Find exercise boring? There are tons of apps out there aimed at making things a bit more exciting. Here are some options:



Zombies Run (iOS and Android): You've odds-on heard about this one before, but it's worth another mention. Fire up the app and let it track your run (either via the GPS or accelerometer on your phone) and while you run, it feeds you snippets of a story about a zombie apocalypse. There are three 'seasons' worth of story, so you'll want to keep running to find out what happens.



7 Minute Superhero Workout (iOS and Android): Don't fancy running from the undead? Train to be a superhero instead! This app uses the camera on your phone to track your movements as it guides you through a series of bodyweight exercises designed to help you fight aliens and save the world. Because you might not want to do another set, but when the world depends on it, you don't have much choice.



Runtastic's Story Running (iOS and Android): Story Running is less of an ongoing commitment, and the stories tend to be less intense and stressful, which may or may not be what you're after. Basically, they're just like audiobooks, but the stories are shorter and running focused, so you can imagine you're a character in another location while you run.



The Walk (for iOS and Android): Another one from the creators of Zombies, Run!, The Walk is for people who want to, er, walk, rather than run. (Although Zombies, Run! doesn't penalise you for not running fast enough, as long as you have zombie chases turned off). It tracks your steps and as you walk through the real world, your character progresses through the game's map, unlocking story segments as you go.



Dungeon Runner (iOS only): Here's another home workout app. This time, your movements guide an 8-bit character through a world of wizards and dragons, as a retro-sounding MIDI soundtrack plays in the background. It's about as nerdy as you can get. Sadly, there's no Android version, and the ideal way to use this is with an Apple TV. If you've got one of those, though, have at it!

various other fitness apps, rather than trying to push its own platform.

Facebook, meanwhile, has bought a fitness tracking app, Moves, to add to its

stable of interesting things. Moves is, as the name suggests, a pure exercise tracker, which logs how far a person walks, runs or cycles in a day and keeps a record of it.

“ Like the New Year, a new fitness app might give you the initial push to improve your health, but it's down to you ”

Although Facebook acquired the company in April, it has yet to do anything much with it, but it's one worth keeping an eye on, especially as fitness trackers become more commonplace.

Microsoft has also dipped a toe into the fitness tracker pool, but to give that metaphor a good mixing, the guys at Redmond seem to be trying to swim against the tide. Rather than launching an app, they've created a wearable, the Microsoft Band. It's a wristband that tracks your footsteps and heart-rate, and it even has a built in stopwatch and lap timer to make it useful while you're working out, not just afterwards. It will nudge you to move more if it thinks you've been idle too long, and it will even pay attention to UV levels when you're outside, so it can stop you from getting sunburned.

The Microsoft Band syncs with your phone – whether that uses Windows, Android or iOS as its operating system – but will obviously mean shelling out more money. Since there are already loads of wearables out there that do much the same job as the Band does, it's not easy to see what Microsoft's is up to here or why you'd be putting one of these at the top of your most-wanted list.

So Will They Work?

So there's a whole host of different apps aimed at tracking what you're doing, what you're eating, how you're sleeping and so on... So what? The idea behind tracking all of that stuff is that knowledge is power – and being told that you're being unhealthy can be a kick up the arse to even the laziest of us. Studies show that observing something can be enough to change it, and while it's easy to ignore something when you don't know you're doing it (or not doing it, in the case of exercise) having the facts in front of you can be shocking.

Also, because you can track things over time, the app provides motivation to improve your stats. Setting measurable goals is also a good way to motivate yourself – and with exercise, half the battle is persuading yourself to actually get out and do some. Obviously, how much of a difference any of these things makes to your routine is ultimately down to you. Even if you set an app to remind you when you've been sitting down for too long, it's possible to ignore the reminder – or turn it off because you're working on something important and haven't got time to do anything about it. Like the New Year, a new fitness app might give you the initial push to improve your health, but it's down to you to stick at it. mm



Wearables

It looks as though Google and Apple's fitness apps will eventually make wearable fitness trackers obsolete. At the moment, though, they can all sync data – and, you know, maybe sometimes you don't want to lug your smartphone with you when you go out for a run. So what are your workout-tracking options?



Fitbit Charge (£95+):

The newest Fitbit wristband is designed to be comfortable enough to wear all day and night. It tracks your steps and your sleep and displays stats on its OLED screen.



Fitbit Zip (£50):

A cheaper option from Fitbit, the Zip attaches to your waistband or pocket. It just tracks your activity and syncs up to the Fitbit app so you can track your progress.



Arki Fitness Tracker:

A Kickstarter funded tracker, the Arki tracks your steps but also detects your posture, so it can help you stand up straighter and correct your gait. You'll need to wait for it to be available though.



Garmin Vivofit (£100):

An alternative to the Fitbit, the Vivofit is another wristband that tracks sleep and activity – and has a (relatively) large screen to display your goals and tell you off when you're not meeting them.



Jawbone UP24 (£125):

A smart-looking wristband that tracks pretty much everything you could want it to track – but has no screen, so it can't tell you the time, but it can buzz to tell you its time to move.



Samsung Galaxy Gear Fit (£130):

It's expensive, mostly due to the large AMOLED screen that can be customised to display whatever info you need. It also has multiple, swappable straps.



David 1995 - 2012

Brain tumours are
the biggest cancer
killer of children and
adults under 40.

**Text HOPE to 70123
to donate £5***

Together, we can
defeat brain tumours

thebraintumourcharity.org

The **BRAIN
TUMOUR
CHARITY**

Jony IVE'S Design Secrets

David Briddock examines the secrets behind Apple's product design

Industrial design (ID) is a blend of art, science and engineering, which has been successfully applied to furniture, buildings, automotive products and packaging, to name just a few. At its best it enhances a product's aesthetics, ergonomics and usability. However, in the early days of the personal computing revolution, industrial design didn't really feature. For years, and regardless of brand, PCs were housed in square beige-coloured boxes, with beige-coloured keyboards and monitors.

Breaking The Mould

It was left to Apple to break the mould, a company that can attract and stimulate those rare individuals who can apply these separate disciplines in a homogenous manner. First came Hartmut Esslinger (whose Apple career spanned 1984-1990) and his 'Frog Design' era, which led to products like the Apple IIc and a design language known as 'Snow White'. Next came Robert Brunner (1990-1995) who was responsible for the PowerBook laptop range.

Most recently there's Apple's latest design guru, Jonathan (Jony) Ive. He's become one of the best known industrial designers in the world, his work with Apple going back to the early (and now iconic) multi-coloured, living-room-friendly iMacs. It was the beginning of a striking series of designs he continued with the MacBook, iPod, iPhone, iPad and most recently Apple Watch, so why is Apple seen as a leader in industrial design, how does it keep moving the



technology goalposts, and how did Ive achieve 'guru' status?

Ive At Apple

Ive's career at Apple started in 1992 when, together with wife Heather, he left London and his previous company Tangerine Design. Despite the obvious attractions of Apple and California, he didn't jump at the first opportunity, but he was finally persuaded to join by Brunner, who had tried and failed to recruit him on two previous occasions. Just four years later, and aged just 29, he took Brunner's position as Apple's head of design when Brunner departed for new challenges at the London-based Pentagram, a prestigious international design firm. Apple apparently had reservations about promoting Ive at such a young age and only took a chance on him after a lengthy, but ultimately fruitless, search for alternative candidates.

During Jony's long Apple career he's been witness to three styles of management: before the exiled Steve Jobs returned to the company he started, during Jobs incredibly successful second rein, and under Tim Cook after Jobs' untimely death. There's no doubt Jony formed a strong bond with Jobs, a fact he demonstrated at the Cupertino campus memorial service for Jobs, where he gave a heartfelt and passionate tribute.

The Ive Formula

As you'd expect, Ive's childhood and educational background (see boxouts) had a seminal impact on the design of Apple products. The

signature white plastic features of his early design days have appeared many times. His love of minimalism, sleek shapes, smooth contours, slim dimensions and lightness is ever present, as is the desire to use only the highest-quality materials and employ cutting-edge technology.

Some of his work is now seen as classic design: for example, the introduction of the iPod scroll wheel, when everyone else used basic directional buttons; the iMac's multi-coloured semi-transparent polycarbonate cases; the clam-shell iBook, complete with integrated handle. More recently, there's been the unibody casing, machined from a solid block of aluminium, for the MacBook Air, iPhone 5 and lately the iPad Air. A meticulous attention to detail is also something he shared with Jobs. Everything from the overall appearance down to the tiniest screw head appears to have been considered, designed and manufactured with equal focus and care. It didn't matter if the item in question would never be seen by its owner, it all had to be as perfect as possible.

66 Meticulous attention to detail is something he shared with his boss of many years Steve Jobs

iDg Studio

Robert Brunner, Ive's predecessor, originally set up Apple's industrial design studio, known as iDg in a separate building on Valley Green Drive, just a short walk from Apple's Infinite Loop campus. However, after Jony took over in 1996, space was made available on the ground floor of Apple's headquarters building.

Thus, opposite the main entrance is Jony's office – a glass cube about three metres square and the only private space in the studio. From here, seated in his Fred Scott designed leather and aluminium Supporto chair, he hand-sketches new ideas and hosts private design meetings, while keeping a watchful eye on the whole studio.

The iDg studio houses an impressive collection of advanced prototyping hardware, from industrial CNC machines to the latest innovations in 3D printing hardware, and some of this equipment is installed in airtight enclosures to safely contain toxic chemicals and fumes. The equipment list is in a constant state of review. The materials of yesteryear, like polycarbonate and stainless steel, require very different manufacturing techniques to the aluminium, muscled glass and even more scratch-resistant sapphire used today.

All this equipment is necessary to fabricate mock-up models and prototypes from sketches and intricate digital 3D design drawings. The design team employs sophisticated computer aided design (CAD) and computer aided manufacturing (CAM) techniques, some of which were borrowed from McDonnell Douglas and other aerospace organisations, then adapted for Apple's specific needs.

With all this machinery you would expect to hear a constant hum around the iDg. Yet, apparently it's far more likely you'll hear the beat of Jony's favourite techno-pop music. Is this music another secret element in the design studio's success?

As you'd expect, security is extremely tight. In addition to the highly secure entry door system, all the windows are heavily frosted to prevent anyone getting a peek inside. Only a handful of Apple employees are allowed to enter in addition to the 16-strong design team. It all helps to maintain a state of extreme secrecy, even within the Apple campus itself.



Apple New Product Process

A key element in Apple's industrial design success is the adoption of its so-called Apple New Product Process (ANPP). It's similar to the methodology introduced by Jobs when he was CEO at NeXT, after he noticed how well it served Hewlett Packard and other Silicon Valley companies.

ANPP is essentially a giant checklist of how to make an Apple product. It covers all aspects of production: each hardware part with its material specification and fabrication method; every single piece of software; and a minutely detailed breakdown of manufacturing, finance, marketing and support operations. Once completed, everyone has a written definition of what exactly needs to be done, step by step and department by department. ANPP's influence extends outside Apple to its suppliers and its suppliers' suppliers.

In modern engineering management circles, an ANPP-type process is known as 'concurrent engineering'. The more complex a product becomes in terms of materials and construction techniques, the more important it is to have a repeatable process, so it's not surprising to discover that both NASA and the European Space Agency (ESA) are totally committed to concurrent engineering practices.

Product Manufacturing

After returning to Apple, Steve Jobs assigned himself the role of managing Apple's suppliers and manufacturing operations. However, in 1998, he

Early Days

From an early age, Jony was fascinated by how things worked. Taking radios and cassette recorders apart then putting them back together helped develop his keen interest in design, function, form and materials. Fellow students and tutors also remember Jony's artistic skills. Even while taking A-levels his carefully crafted drawings were production-level quality and clearly communicated the key design aspects. He also built numerous models, and a strong attraction to minimalism was evident in his love for white plastic mock-ups.

“The IDg studio houses an impressive collection of advanced prototyping hardware”

hired ex-IBM and Compaq man Tim Cook to reorganise Apple's entire manufacturing and distribution chain. Jobs famously reduced Apple's product line down to just four items, but it was left to Cook to address problems with a badly fragmented manufacturing pipeline. Eventually, he began assigning product responsibility to a single supplier – for example, Foxconn builds the iMac, while Quanta Computer builds the PowerBook (both are based in Taiwan).

This kickstarted a long relationship between Ive and Asian suppliers. He spent long periods of time at factories in the Far East pioneering new materials, new manufacturing techniques and fussing over every



aspect of production quality. One key technique he employed was 'friction stir welding' (FSW), which effectively recrystallises a material's atoms to form a super strong bond. It's used to obtain razor-thin edges on Apple product cases.

To deliver the kind of volumes Apple requires, however, means purchasing huge quantities of sophisticated CNC milling machines required to handle any new process involved. In fact, in the late 2000s, Apple attempted to acquire the complete production run of certain bands of CNC equipment to this end. As you'd expect, none of this comes cheap; one CNC machine costs anything from \$100,000 to \$1 million, so the total investment involved is immense. In fact, to begin production of the aluminium unibody iPhone 5, Apple is reported to have invested an eye-watering \$408 million in CNC equipment alone.

Design Recognition

Jony Ive has cemented his place in design history. He's seen as a legend within Apple, which promoted him to the lofty position of Creative Head in 2012. Its millions of loyal customers appear to hold his work in equally high regard, even if they may not know him by name (though many do).

His work has also gained wider peer recognition, with awards from

Michael Ivey

Michael Ivey was a silversmith by trade but also a teacher. In fact, his father's teaching abilities were so admired he was plucked from a daily teaching role by the Education Ministry and given the grand title of Her Majesty's Inspector. In this role he assumed responsibility for monitoring the quality of teaching at schools in his local area, focusing specifically on design and technology, so there's no doubt Jony's fascination with design is in part down to his father's activities. Many father and son conversations had a design focus, and trips to London's design studios would prove highly motivational.

the Industrial Designers Society of America, London Design Museum, British Design & Art Direction and many others. He received a CBE in 2005, and he was named Knight Commander of the British Empire (KBE) in 2012 – a status that exceeds his father's OBE, bestowed in 1999. It's also easy to see that his design influence extends well beyond Apple. For example, his Harman Kardon SoundSticks speakers are now in the Museum of Modern Art collection. Working for Apple has substantial monetary benefits too, both in

“ Jony has cemented his place in design history ”



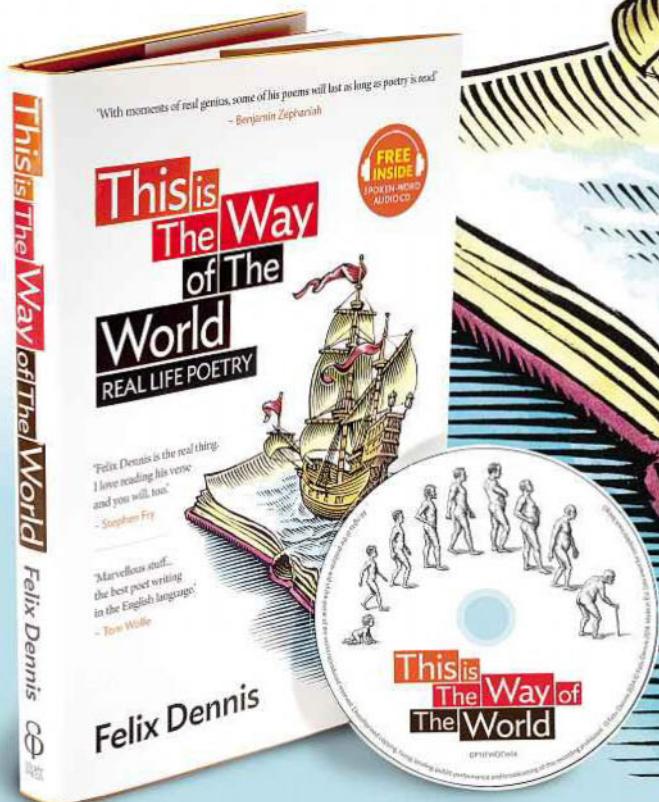
salary and share options, so it's no surprise Ivey's nimble ascent of Apple's organisational tree has left in him an enviable financial position: in 2012 he purchased a \$17m San Francisco 'Gold Coast' home, and his garage is full of high performance cars. **mm**

'With moments of real genius, some of his poems will last as long as poetry is read.'

– Benjamin Zephaniah

This is The Way of The World

Felix Dennis



RRP
£12.99
AVAILABLE NOW
FROM AMAZON
AND ALL GOOD
BOOKSELLERS



**A book of poems for those who
don't read poetry** (as well as for those who do!)

A collection of 'real life' poems by Felix Dennis, one of Britain's best-loved poets, charting life's course from infant to endings with illustrations by Bill Sanderson.

www.felixdennis.com contains many poems, published and unpublished, as well as a library of sound recordings and video footage of Felix Dennis's verse and poetry tours.

EBURY
PRESS

Your Letters

Spectrum Tape Lost In Action

Micromart's David Hayward has been very helpful with Spectrum help: the Spectrum app K7ZX has appeared as "App of the Week" in both issue 1336 and 1277. Here he mentions 2 his types of loft clearance: the "significant" loft clearance and the "drastic" loft clearance. My own clearance program has been different: it is of the "moving stuff around a bit" type where the desire to clear is mitigated by the desire to re-find all the Spectrum stuff up there: it therefore fits into the "extremely slow" loft reorganization category. But, nevertheless, progress has been made and I am about 50% through the Spectrum stuff and have located a quite large number of my original Spectrum tapes.

It has been well over a year since last used Jonathan Needle's wonderful "Spectacular" (with lifetime license) programme for PC using Spectrum tzx files. "App of the week" in Issue 1266 covers this but basically with this prog/app you can play Spectrum games on a PC using TZX files.

So I decided to get "Spectacular" back into "action" with a particular aim:- Could I find a missing Spectrum tape that was lost to the world and which could be found again? This is what I mean: - The "World of Spectrum" (and other similar sites) allows you to search their Spectrum

archive. But, when I did this, I found that, to my "horror" the "A-Level Sociology" tape released in 1984, published by Akadimias Software (UK) and written by John Borland, as at 09/12/2014, was described on the "matches and downloads" section of the site, as "Missing in Action!": so where can I turn to, to learn about things like Marxist Sociology in action? Is Marxist sociology itself now also "missing" in action and with the tape lost, probably forever, will I ever be able to find out?!

Also other tapes are listed as "Distribution denied": I found some games from Code Masters Ltd and Electric Dreams were in this category but there were some others as well. Sometimes the TZX files did not appear to work but this was quite rare. Sometimes there were complications like a side B question pack had to be dropped in so get the game working: "Bob's Full House" would be an example of this. But overall this was a very quick and easy way of getting back to these old games.

My first step was to see if I could find another rare tape. I picked out one of my "loft" tapes "Great Britain Ltd" a tape I paid £6.00 from Boots in the 1980s. This was not a £1.99 "cheapo" but a full price

Democracy type game! A modern PC equivalent would be "Democracy 3". Initially, when I had looked quickly on "World of Spectrum", I could not find "Great Britain

Ltd" so I tried Wikipedia and amazingly it had its own page which gave a link back to the "World of Spectrum" its where I found it where it had been all along: it was not rare after all and certainly not "missing in action"! I tried the game out: the 4th political party, in those days, was the SDP. I wondered if the program could be modified to include UKIP and the Greens, as it is written in Basic. I gave the game a quick whirl and in no time at all inflation was at about "3 million %" and I was out of office. This was not like the modern PC based "Democracy 3" game where I could get into a "re election" groove and stay as Prime Minister almost forever. Democracy 3 was interesting but it did have this characteristic, sometimes, with me at least. So I have some more loft "tape finding" to do to get that elusive "lost/Missing in action" tape. I seems that educational tapes are most at risk of being "missing in action" and I know I must have some of these somewhere surely? They often came in big plastic cases and this is why I stored them separately from the ordinary tapes and this is they cannot be easily found. One other essential item, now quite rare new, is the portable cassette tape recorder. On Amazon I could only find one of these, the Philips AQ1001 at about £35.00, on Amazon, that was still available new.

How should old tapes be used/looked after? Well about

10 years ago, on the radio I heard, a member of the Doors Music group discussing the re-mastering of their old music tapes: the group member said that they had the tapes professionally warmed up in a special oven so that they were not damaged: and this had been OK. Well I have tried an "oven bake" with a laptop but I would not know how to attempt it with audiotapes!

David Hayward who found his tapes to be in a poor state but I have not tried any of mine yet so I do not know. But using Spectacular and TZX files means these games can be played (without using the tape): though the interface options need a bit of thought/work to figure out. It is a work in "slow progress"!

Harry Deakin

GET IN TOUCH...

By email
letters@micromart.co.uk

By post
Micro Mart
30 Cleveland Street
London
W1T 4JD

Online
forum.micromart.co.uk

Component Watch

Brighten up your computing life with a new monitor!

Now that it's 2015, it's time to bring your media habits kicking and screaming into the 2015. That means HD isn't enough any more; you need a 4K monitor, and if not one of those, a 3D one (and some glasses to complete the look). High-end screens aren't cheap, we admit, but there are ways of finding them cheaper. You could, for example, check out the deals we've found on them. Just don't blame us if it makes you decide to upgrade your entire DVD collection into Blu-ray.

Deal 1: Asus VG248QE

RRP: £300 / Deal Price: £245

This 24" active panel 3D monitor is expensive, as monitors generally go, but it's also super-sharp, bright and high-resolution with a huge number of inputs and a selection of presets to help you configure the best visuals regardless of the situation. Whether for 3D movies, 3D gaming or just normal 2D work, this is a monitor that competes with the best of them so it worth what's being asked for it – especially with over £55 off.

Where to get it: Dabs (bit.ly/1qXPqtO)



Deal 2: BenQ XL2411Z

RRP: £260 / Deal Price: £225

The 24" XL2411Z has several BenQ-unique features, including built-in Motion Blur Reduction technology and Low Blue Light LEDs, which prevents eye strain, saves energy and reduces sleep-cycle disruption for the user. Its 3D-capabilities allow

it to run in 100Hz, 120Hz or 144Hz mode, and the Display Pilot software that it runs allows you to quickly set and save viewing profiles depending on your settings preferences. It's a little less impressive than its more expensive line mate, the XL2420Z, but at £45 less (£75, with this natty discount, which shouldn't be sniffed at) it's also far better value!

Where to get it: CCL (bit.ly/1yWD3fj)



Deal 3: AOC D2769VH

RRP: £225 / Deal Price: £200

This passive-3D screen is cheaper than active-shutter monitors, but it's also 27", which represents a considerable increase in screen real estate over 24" varieties. Both of these features make it ideal as de facto TV screen to share with others in the room. Dual HDMI inputs make it perfect for use as a console screen. Great value.

Where to get it: Ebuyer (bit.ly/13vhwm6)



Deal 4: Samsung U28D590

RRP: £440 / Deal Price: £414

The 28" Samsung U28D590 is one of the cheapest 4K monitors you can buy, but a 1ms response time and dual HDMI inputs with DisplayPort make it superb for games and movies. There's even a 'Game Mode' to optimise colour, brightness and contrast. Combine that with 'MagicAngle' enhancements, PIP/PBP and Ultra HD upscaling and this monitor justifies that super-high price.

Where to get it: Box (bit.ly/13vhJWs)



Deal 5: Asus PB287Q

RRP: £415 / Deal Price: £395

The 28" Asus PB287Q is a similarly excellent 4K monitor; slightly less feature-packed, it does have a flicker-free backlight and strong anti-ghosting technology for gamers, while built-in 3 watt speakers and HDMI, DVI, DisplayPort and VGA sockets ensure you get everything you need to get a 4K system up and running immediately. At under £400 it's incredibly affordable for its size and class, and that makes it an ideal entry-level 4K monitor for the slightly more demanding buyer.

Where to get it: Scan (bit.ly/1xqwXZs)





Hey, it's 2015. It's cold and Christmas is a long-forgotten dream/nightmare, depending on your point of view. What better way to say hello to this new year than, erm, saying ta-ta to 2014 with our look back at some of the news stories that made headlines and heads turn last year. You can think of lots of better things to do, you say? Well, humour us anyway and read on.



February

Ah February, a time for love, flowers and – apparently – big staff appointments, as Microsoft announced that Satya Nadella (that's him pictured there) was to be the new main man to follow in the sizeable footsteps of Steve Ballmer (remember him?).

Ten-year old Facebook celebrated its first decade of existence by spending big on WhatsApp – \$19bn big – leading to much debate as to whether this was a wild spend or solid investment.

Dong Nguyen became famous for five minutes for taking down his Flappy Birds app after it became so popular and he felt bad about its addictiveness.

Finally, the good chaps at Naughty Dog were delighted at having such a popular game on their hands in *The Last Of Us*, as it bagged one of what would be over 200 game of the year awards at the DICE gaming awards in the US.

Finally, one particular story that put a spring in our step going into March was the tale of the cyclist who found himself on the M25 thanks to a mobile app misdirecting him. The Police tweeted "A male was looking for a shorter route to cycle home from work. Phone app sent him on motorway so thought it OK." Brilliant – and absolute proof that technology doesn't replace intelligence.



March

BlackBerry's CEO John Chen was frighteningly honest at the start of the month when he rated the firm's chance of survival at 50/50 during an interview with the *Financial Times*. Turns out that BlackBerry did indeed survive the year, even going on to release the BlackBerry Classic phone at the end of 2014.

Birmingham's NEC played host to the Big Bang Science Fair this month, and witnessed a robot setting a record time for solving the Rubik's Cube – 3.253 seconds.

The world's largest Bitcoin exchange MtGox said that it had found 200,000 of the bitcoins it had lost in February, seeing them in an old digital wallet. While 200,000 is a decent figure, it rather paled in comparison to the 650,000 it had lost to hackers. Next month, the service would go into liquidation.

Let's end the month on a different note. In Utah, a young man was arrested for damaging his dad's motorbike after he switched off his Xbox console while he was in the middle of a game. We have nothing more to add to that.



January

The computing year began in earnest, as it always does, with the CES show and – though there were all sorts of technological marvels on display – the event will be most memorable for us for Michael Bay's outstanding public meltdown during a presentation for one of Samsung's curved displays. In his blog post on the matter, Bay wrote that "I guess live shows aren't my thing."

Alicia Keys decided that BlackBerry was no longer her thing, either – and, after a year as the company's 'global creative director' – ended her association with firm's Keep Moving project.

Microsoft said that it would change the name of its SkyDrive service to OneDrive, while Yahoo displayed its faith in the Summly app it acquired in 2013 by launching news summary app Yahoo News Digest, for which an iPad

version came later in the year. Google bought smart thermostat maker Nest Labs for a cool \$3.2m plus sold Motorola, while Zynga bought NaturalMotion.

Away from the so-called 'big boys' and their shopping sprees, a fridge sent out a spam message – really – and an old NES cartridge of title *Nintendo World Championships* sold for \$99,902 on ebay, or rather it didn't actually as the buyer eventually pulled out of the deal.



Welcome once again to our annual look back on the year just gone, where we go over the biggest and most interesting news stories from the last 12 months.

For me, 2013 was the year I bought a 3DS and my first mechanical keyboard. It was also the year I first played a subscription-based MMORG: The Elder Scrolls Online. And it was also in 2013 that I stopped playing that game and quit Twitter – then returned to it later.

This year, I'm looking forward to a few things, including a new range of virtual reality products, which have the potential to make not only gaming but computing in general interesting again.

I might even make 2014 the year I buy a smartwatch, although that's mainly because the speaker on my phone is so quiet I can't hear it ringing.

Most of all, though, I'm just looking forward to whatever great surprises 2014 might hold. Here's hoping it will be a good year.

See you next time...

Anthony

Editor

OneDrive

April

Early in April, the first sightings of the reversible USB Type-C design were released into the wild, making the lives of lazy people everywhere that bit easier. The finalised specification was unveiled in August. Expect to see something concrete this year.

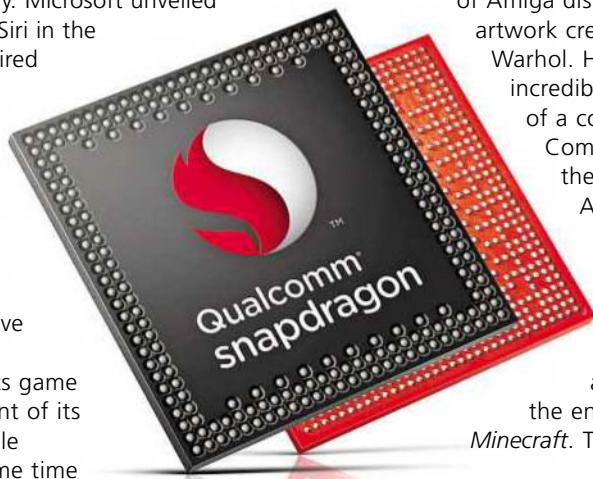
Over at Mozilla, a recent change of chief executive came to an abrupt end as Brendan Eich's strong views on same-sex marriage saw both him and the company coming under heavy fire. Eich stepped down, but the damage was somewhat done already. Microsoft unveiled its own competitor to Siri in the shape of the Halo-inspired Cortana, while a five-year old spoke out against a key security flaw in the Xbox One console. For his efforts, young Kristoffer Von Hassel was given a year's subscription to Xbox Live plus some games.

Qualcomm upped its game with the announcement of its Snapdragon 810 mobile processor, due out some time

this year, and Google Glass went on sale to the public in the US. The domineering story, though, was the discovery of the Heartbleed bug, thought to have been exposing passwords and personal data for two years. Cue widespread media coverage and panic, until patches were released and the bug was ultimately fixed.

Best story of the month, though? Probably the hunt for a bunch of Atari game cartridges in a New Mexico landfill site. Alternatively, we could make a case for the find of a bunch of Amiga disks housing digital artwork created by Andy Warhol. He created these incredible artworks as part of a commission from Commodore to help with the launch of the Amiga 1000.

Finally, in this busy month, to Denmark as the government decided to go ahead and recreate the entire country within Minecraft. Time well spent.



Meanwhile... On The Internet...

Such were the deadlines for *Micro Mart* during December, as we write this column, the final episode of the *Serial* podcast has only been out in the wild for around 24 hours (yeah, I know: fancy having Christmas Day and New Year's Day on Thursdays, when we should be having *Micro Mart* Days, amirite?), but the fallout from that final 45 minutes began pretty much straight away, with people on different sides of the fence lauding or berating the show's conclusion in equal measure.

If you don't know what *Serial* is, you've basically missed one of the biggest podcast series of all time. It was the fastest to five million downloads according to Apple (tinyurl.com/Motl1344a) and was averaging 1.26m downloads per episode according to the Wall Street Journal (tinyurl.com/Motl1344b), though that's probably small beer now. Such was its influence, even on this side of the Atlantic, it was eventually picked up and broadcast by the BBC in UK (tinyurl.com/Motl1344c). For Meanwhile...'s money, it's one of the most enthralling uses of the medium we've ever come across (we're not alone: tinyurl.com/Motl1344d).

We won't spoil it all for you here (though some of the later links probably would) and encourage you to listen to it yourselves (here: serialpodcast.org). Just to be clear, though, it is a 12-part podcast that reflects on the case of Baltimore man Adnan Syed, who was convicted of murdering his ex-girlfriend Hae-Min Lee as a 17-year old in 1999). Syed has always maintained his innocence in the case, and the intriguing anomalies, inconsistencies and relatively flimsy evidence used to convict him has proved to be rich ground on which *Serial* could grow from an off-shoot of radio show *This American Life* (www.thisamericanlife.org) into an online juggernaut of its own.

It's blindingly obvious that we're not alone in rating as one of the web highlights of 2014, but we consider it to also have been one of the most interesting pieces of media of 2014. Full stop. There are several reasons we could quote for this.

The Format: In a world where we're told everything is speeding up and information must be condensed, that anyone would think taking 12 weeks to forensically focus on one story is laudable. That *Serial* is a podcast is vital to this; unrestricted by schedule times and slots, the show breathed in a steady way that allowed the episodes to perfectly fit what needed to be said. The informality of the format was, it bears pointing out, expertly wrangled by these radio pros that produced it so as to create an almost seamless blend of the personal reflection and hard-edged journalism. There are potential downsides to this (tinyurl.com/Motl1344e), though, and it has thrown up interesting ethical questions about the way the story was told.

You can also add to this the fact that it's producers and presenter used a lot of techniques from drama production to ramp up the tension through the story (such as the now common 'Previously on...' pre-show sting, a steady flow of information punctuated by the occasional larger reveal and regular cliffhangers). Indeed, it's been widely identified as one of the reasons for the show's eventually rabid fandom – a force for good and bad.

The Personnel And The Personal: *Serial*'s presenter, Sarah Koenig (said: Kay-nig, as we are reminded every week), has proved to be a very human, fallible voice (just ask the woman who dragged her into all of this: tinyurl.com/Motl1344f). Rather than portraying the assured omnipotence we often see in documentaries these days, she has held our hand through the

dense ebb and flow of the case against Adnan Syed in a very human way.

Not afraid to express doubt, frustration, insecurity, bemusement, anger – and yet ultimately brave enough to nail her colours to the mast at the end – she showed the reality of being close to a case like this in ways that audiences don't often get to experience. The nature of podcasting invites personality into it all. By the time you've spent hours listening to someone talk, it's hard not to feel like you know them. And she's proved just as interesting a character as any of the protagonists the show has introduced us too. Some have criticised her for her level of personal involvement, but in terms of the success of *Serial* as a whole, it appears to have been vital.

The Fans: *Serial* very quickly fell into the virtuous circle that social media can instigate: people started to discuss it, then people started to discuss why people were discussing it, then blogs and newspapers started to discuss it and wonder why people were discussing it so much, then more people listened to find out what all the fuss was about... and the cycle began again. It's nature as a pick-it-up-when-you-can podcast allowed rapid binge listening to get up to speed, after which fans could quickly head directly to Reddit or Twitter to discuss theories (tinyurl.com/Motl1344g). However, despite the constant speculation about motivation/personalities/facts/lies being one of the more alluring aspects of the whole thing, it was also one of the more distasteful.

The way in which the fandom of *Serial* operated has been compared to those following, say, *Lost*, *Game Of Thrones* or *True Detective*, but it's none of these – as one of Hae-Min Lee's brothers took to Reddit to point out in no uncertain terms (tinyurl.com/Motl1344h). *Serial* is real people, and real drama – a fact that makes it both fascinating and personal at the same time. If nothing else, it has exposed some of the foibles of the justice system in America that are rarely seen.

It would seem that the same liberties the production team took with conventional down-the-line journalism/investigation to make the show so addictive, intriguing and dynamic (new evidence appeared during the series from people listening to the podcast itself) also blurred the lines between real and fictional (tinyurl.com/Motl1344i). This was reflected in the clamour for a conclusion, and the noted cynicism that began to run through its fandom when they began to suspect that not everything was going to be tied up neatly at the end – y'know, like *The Sopranos* hadn't tipped the show's creators off that this simply wasn't acceptable (tinyurl.com/Motl1344k).

Aaaaaaaand Finally...

Was it tied up? Well, we're not going to tell you if you don't know... That would spoil the journey. Which is, as far as we're concerned, what *Serial* was all about. There's not much uplifting about what actually goes on within the story of Adnan Syed; in fact, it's largely an unremittingly bleak tale that no one comes out of particularly well. However, the fact that someone not intrinsically involved in the facts of the case cares so much about it, that someone – even after 15 years – was willing to take this time and effort over something like this is what's life-affirming about the show; it's why we loved it so much.

While that doesn't sate the uncomfortable voice in your head questioning whether all of this is just a bit too voyueristic/skewed/overplayed/underplayed/whatever, it outweighs all of those factors and brings the positive/negative equation of the show into the black. *Serial* is definitely worth your time.

Caption Competition



Christmas may seem like a distant memory now, but this was top-of-the-topical-pops back in issue 1342. Here's the best of your submissions...

- **Ondrive:** "When ZZ Top's chart success dried up, they needed to find new careers."
- **Half-a-daily:** "Who is Santa Claus' favourite singer? Elf-ish Presley, of course."
- **Martin Prince:** "Bummer, the reindeers have left me behind! Now I'm gonna have to Walk, man..."
- **JayCeeDee:** That iPod Touch would be wasted on Little Jimmy!! Much better if I use it on my deliveries tonight.
- **JayCeeDee:** The new ZZTop Santa really rocks.
- nadine.wood: "Santa didn't like Anaconda, no presents for Nicki this year!"
- **The Duke:** "Anfield Rap Christmas Special."
- **Leigh Spriggs:** "Well, he needs something to block out all those damned Christmas carols."
- **Danny Bend:** "Hip-hop Santa doesn't say 'Ho, ho, ho', he says 'Yo, yo yo.'"
- **Rick Kemp:** "He may not be the greatest dancer, but certainly has presence."

Thanks, all. Our winner this time round is The Duke for "Anfield Rap Christmas Special", simply because it mentions the Anfield Rap.

To enter this week, head to the 'Other Stuff' section of our forum (forum.micromart.co.uk) and say something funny (but not too rude) about the picture below or email us via caption@micromart.co.uk.



May

Remember John McAfee? Well, he made a comeback this month with his backing of the launch of his instant, privacy-centered messaging app Chadder. The encrypted messaging app has received some lukewarm reviews, but McAfee was back, and that was the real news here.

In terms of big business stories, Apple acquired Beats Music for a massive \$3bn, raising a few eyebrows with the size of the valuation in the process. Dr Dre wasn't complaining about that, though, ending the year as the world's highest-paid musician thanks to this acquisition.

Talking of record numbers, Sony broke a record this month with the development of a new storage tape that can hold up to 185TB of data per cartridge. Roomy.

Weird news came out of Hong Kong when a venture capital firm announced that it appointed a computer algorithm to its board of directors. VITAL was used to cast a vote on investments, basing its call on vast amounts of financial data.

Back in Blighty, there was better news for the Game group, following the redundancies of 2012, as the firm announced plans to list back on the London Stock Exchange.

June

Eugene Goostman, interesting name though it is, is not actually that belonging to a man. It's a chatterbot, and an important one at that, as it managed to fool a third of judges at London's Royal Society that it was a human being. This was all part of the Turing test, looking at testing whether someone is interacting with a human or a machine.

Twitter gained a new member this month in the shape of the CIA – the wags tweeted "We can neither confirm nor deny that this is our first tweet." Ho, and indeed, ho. Less hilarity over

at Microsoft as an advert for its Xbox One console featuring *Breaking Bad*'s Aaron Paul was so effective, it actually switched on users' units when the Kinect voice sensor picked up on him saying "Xbox On."

Google Glass came to the UK at last, the Explorer version setting you back £1,000. Yikes.

Congratulations were in order for BlackBerry for managing to post a small profit following years of multi-million dollar losses.

And another Congratulations to *Elite* co-writer David Braben for nabbing an OBE in the Queen's Birthday Honours list. More on him later.



MM's Top 10s Of 2014

Top 10 Games We Played In 2014

1. Call of Duty 2
2. Far Cry 4
3. Tropico 5
4. Words With Friends
5. Gauntlet
6. Middle-earth: Shadow of Mordor
7. The Last of Us
8. Elder Scrolls Online
9. The War of Mine
10. Hitman Go

Top 10 Things We Ate In 2014

1. Reece's peanut butter
2. Our birthday cake
3. Someone else's birthday cake
4. A pulled-pork cheeseburger
5. Spitroast pork sausage rolls
6. Loads of curry flavour Pot Noodles
7. Really big hotdogs
8. An ice cream that was way too big
9. Sticky rice
10. Fizzy popping candy

Top Films We Watched In 2014

1. Guardians of the Galaxy
2. Robot and Frank
3. Stretch
4. Joe
5. St Vincent
6. Journey to the West
7. How to Train Your Dragon 2
8. Predestination
9. Boyhood
10. Dawn of the Planet of the Apes

July

July was to see the UK game developer Crytek UK cease to be, but staff were thankfully moved over to the new developer in charge of the *Homefront* title, *Deep Silver*. More redundancy news came out of Microsoft, and this was a big one as 18,000 jobs were announced to be cut worldwide over the course of the next year. Largely due to the absorption of the Nokia business and the closure of the Xbox Entertainment Studio, this proved that no matter the size of the company the economic climate was taking its toll on all.

Indeed, it was all about the numbers this month, as a huge \$5m prize was up for grabs for the winning team at the annual Dota 2 international tournament over in Seattle, while a far lower \$35 would buy you an updated Raspberry Pi.

Sony was on the wrong end of the figures when a US judge ordered it to pay \$15m worth of goodies to US customers who suffered from the PSN hacking affair back in 2011. Sounds a lot, but it essentially meant free games or a subscription to PS Plus for gamers who qualified.



Mozilla ended the month off on a happier note, though, as it gave interim CEO Chris Beard the full-time job following Brendan Eich's departure.

August

In a year that saw Sony in the headlines too often for the wrong reasons, a really very angry gamer sued the firm this month to the tune of \$5m for misleading claims over the resolution of title *Killzone: Shadow Fall*. Douglas Ladore felt that, as the multiplayer feature of the game didn't utilise true 1080p resolution, Sony shouldn't have lied to gamers about it.

John McAfee makes it into the round-up of the year for a second time this month, thanks to his involvement in The Brown List, a website launched in August allowing its participants to have a good old rant with a view to getting some sort of result out of the whole affair.

In the first of a couple of Selfie-related stories, a Swiss Parliament secretary posted a naked Selfie at work, and was

then oddly worried that her colleagues may see the snaps. Erm, just don't take them in the first place?

Then, we had the unfortunate tale of a photographer who lost out on £10,000 in revenue over a two-year period because of a copyright row over a monkey selfie after a US judge ruled that the monkey owned the rights.

Oh, and it was Happy Birthday to the IBM Simon, the world's first smartphone.



September

We can only presume that anyone with shares in Alibaba enjoyed September an awful lot more than the rest of us, as its huge IPO this month – to the tune of £25 billion, no less – captured the attention of tech lovers and investors everywhere. If you hadn't heard of Alibaba before, you have now. A bigger IPO than Twitter, Facebook, and Google. Combined. Wow.

Apple released iOS 8 (pictured) in September and it was greeted with all sorts of howls of derision from iPhone owners unhappy with poor reception and Touch ID issues – with Apple's new iPhone 6 and 6 Plus handsets also released this month, and not at all coincidentally. It also managed to annoy a lot of iTunes users by downloading U2's latest

album on their systems without asking them.

Further afield, a security researcher managed to hack a Canon printer so he could play *Doom* on it. Really. Michael Dell told the world just how much he and his company believed in desktop PCs, and it emerged that *Minecraft* would be used to recreate the real world once more, this time the British Museum and everything in it.



October

Given the success of its predecessor, it probably wasn't that surprising when Tesco announced a successor to its budget Hudl tablet. It also wasn't a surprise that the name was frighteningly obvious: Hudl 2.

Staying on the names theme, Apple opted for Yosemite when it released its latest OS X and Hewlett-Packard split itself into two newly named companies, HP Inc. and Hewlett-Packard Enterprise, in a bid to freshen things up. Finally, Lenovo made use of a big name of its own when product engineer Ashton Kutcher fronted its YOGA Tablet 2 Pro launch via satellite link-up.



November

As the nights drew in and we all pulled on our warmest gear, *World Of Warcraft* fans had a reason to be cheerful with the release of the *Warlords Of Draenor* expansion pack. Fans of television and gaming could also pick up the PlayStation TV Sony launched to compete with Google, Apple et al.

Google gave Android users an early Christmas present with the launch of Android 5.0 Lollipop which, silly name aside, was actually a pretty useful update, offering a new look, a notifications revamp, faster performance and better battery life. Which is nice.



In the US, huge hack on Home Depot snaffled 53 million customer email addresses, alongside millions of credit card details. This wasn't the highest-profile incursion, however, as Sony Pictures Entertainment's systems were infiltrated, leading to the leak of some movies, scripts and documents – and spawning unwanted headlines.

And that Atari cartridge story that just keeps on giving? Well that led to an auction of some of the titles dug up in the desert earning over \$36,000.

December

And so we come to the end of the year. Of all the gifts and new offerings on offer during December, perhaps the most heart-warming was the release of *Elite: Dangerous*. The crowd-funded sequel to the classic space game hasn't been all plain-sailing – with the pulling of an offline mode for 'creative' reasons causing serious upset among many previously interested gamers. We're still glad it's here, though.

Gangnam Style broke YouTube views counter, *Grand Theft Auto V* was taken off sale by a couple of retail chains in Australia.

The Raspberry Pi had to face up to some barebones competition from

The idea of going back to school seemed a lot more palatable when a free school dedicated to video gaming was put forward by entrepreneur Ian Livingstone.

For AMD it was yet another industry tale of cuts as it announced a 7% slashing of its workforce.

Finally, the cake and candles this month were reserved for the Computer Conservation Society, which turned 25. A very happy birthday!



Imagination's Creator CI20, and we said a sad farewell to the "father of video games", Ralph Baer.

What will 2015 bring? More of the same, truth be told – but look out for Apple's iWatch among a fresh raft of wearables coming your way, the launch of Windows 10, and quite possibly some Intel-powered Google Glass developments.

AOC G2460PG Nvidia G-Sync

A monitor that lays the foundations for new and interesting technologies

DETAILS

- Price: ~£330
- Manufacturer: AOC
- Website: goo.gl/rcK9Vs
- Required spec: DisplayPort graphics card, Nvidia GTX 750Ti and above

AOC has adopted a number of technologies over the years to better improve its already impressive range of monitors and to offer that little something different from the competition.

It's a gamble but one that more often than not pays off – partly due to the fact that AOC knows what it's doing, and because despite the technology involved, it still offers the product at a reasonable price.

In this instance, we're looking at the Nvidia G-Sync technology as fitted in AOC's new G2460PG monitor. Aside from being a 24", 1080 resolution LED, Ultra Low Motion Blur panel, the G2460PG offers an 80,000,000:1 dynamic contrast ratio and a response time of just 1ms.

The monitor can also tilt from -5° to 22°, the height can be adjusted to 130mm, and it features a USB hub with a



pair of USB 3.0 ports located around the back of the screen and a further two USB 2.0 ports, one of which is a red-coloured fast charge port.

The Nvidia G-Sync element works through an internal G-Sync module, which will allow the monitor to synchronise the image on the screen to the output of the graphics card, as opposed to the more traditional method of the graphics card having to sync with the monitor. The

result of this technology is a tear-free, lag-free, richer and much improved visual experience when either gaming or watching HD content.

Of course, you need one of the GTX cards, from 650Ti onward, to appreciate the full force of G-Sync on your screen. And in all honesty, even with a GTX 650Ti installed on a half decent system, there aren't that many games that will cause tearing and the image will be pretty sharp to begin with.

There's also the fact that despite the Nvidia proprietary hardware installed, this is already a really good, fast response monitor. So even those without GTX cards probably won't see anything that would suggest their setup is lacking in any way.

That said, gimmick or no, AOC has a knack for making excellent quality products, and this example doesn't

disappoint. The build quality is superb, the screen image is wonderfully clear and sharp and we like the fact that it's ergonomically better than most other monitors around at the moment.

That said, there is one particular element we don't like, which is the fact that the only video input is DisplayPort. Indeed, there's no DVI or HDMI, which is quite surprising really. We imagine this keeps the cost down, since it already includes the Nvidia technology, or maybe it's something to do with the G-Sync and DisplayPort only. We're not sure, but having just DisplayPort does rather limit your choices. To be fair, though, you do get a two metre DisplayPort cable in the box.

After all that said and done, the AOC G2460PG is a monitor that's certainly worth looking into if you're in the market for an upgrade. The technology foundation is there for potential graphics card upgrades, and the results are very splendid indeed when coupled with the right hardware and equally as good if you don't own any Nvidia kit.

mm David Hayward

New technology can be difficult to launch, but AOC has done a good job



Synology DiskStation DS415+

A SOHO essential NAS with plenty of extras

DETAILS

- Price: £460
- Manufacturer: Synology
- Website: goo.gl/8j33je
- Required spec: Gigabit network for best results, 2.5/3.5 SATA2/3 HDD, OS independent



Synology has just about perfected the NAS solution for small businesses and 'prosumers'. Its DiskStation 412+ range was hailed as being one of the best examples of a NAS unit around for the pro user and business workgroup.

It's since stepped up a gear, though, and has now released the DS415+, a four-bay NAS drive complete with an Intel Atom C2538 quad-core, 2.4GHz CPU, with 2GB DDR3 memory and a built-in Hardware Encryption Engine conforming to an AES 256-bit military grade algorithm.

Other features include a single USB 2.0 port, a pair of USB3 ports, an eSATA port and dual

gigabit Ethernet ports. The two large 92mm fans located at the back of the unit do a more than adequate job of keeping the four drive bays cool, even when under substantial load.

Naturally, this increases the noise of the device somewhat, along with the drives chugging away in the hot-swap frames, but the design of the DS415+ does dampen the noise level slightly. The on-paper level indicate 20.2dBA, but we're tempted to say that with four 1TB drives

fitted and whirling away, the levels never really reached much above half that number.

The DS415+ is actually quite a stylish looking unit for a business orientated NAS drive. The matt-black finish of the body, with air vent Synology logo imprinted on the sides, is complimented by the piano-black polished door, which is easily removed thanks to four rubberised plugs that squeeze into the drive bay slots.

Behind the hardware, though, is the real star of the show, the DiskStation Manager operating system. Now on version 5.1, this Linux-based OS boasts a much improved security enhancement by utilising AppArmor to block any unauthorised access to the system resources through malicious programs.

DSM 5.1 also offers improved backup apps, which include off-site and cloud storage, as well as several anti-virus packages, a surveillance command station, iTunes server, an eCommerce solution, email server, podcast generator and a WordPress platform tool.

Needless to say, there are countless more apps and packages that cover near every aspect of a business as well as



the more traditional media and file sharing. Each is executed exceptionally well, part in thanks to Synology making sure that its DSM packages are developed correctly, as well as the impressive hardware that's driving the unit. Get a few packages up and running and you'll soon see why Synology has opted for a more powerful quad-core Atom with 2GB RAM over the previous 412+'s dual-core D2700 with 1GB RAM.

There's a lot going on with the Synology DS415+, such as the fact you could potentially have 24TB of storage with four 6TB drives. Plus there are multiple RAID levels to choose from, and you can arrange several Synology DiskStations into active and passive clusters for advanced mirroring, which is simply incredible.

With the Synology DS415+ firmly established in your server infrastructure, there's really no excuse to ever get left behind in terms of technology, storage management, business continuity and productivity.

mm David Hayward

An excellent business orientated NAS,

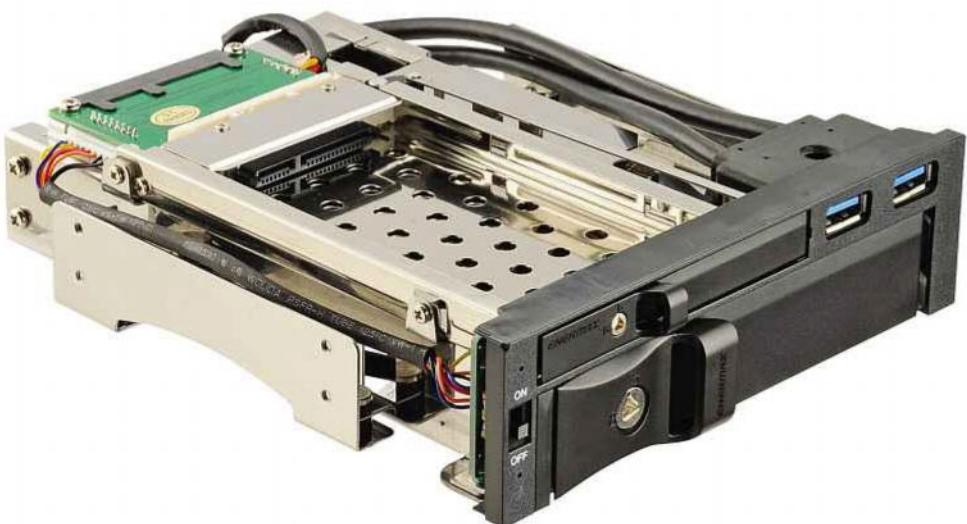


Enermax EMK5402 And EMK5201U3 Mobile Drive Racks

Mark looks at a couple of mobile rack solutions from Enermax

DETAILS

- Price:
EMK5402 £49.99
EMK5201U3 £32.90
- Manufacturer:
Enermax
- Website:
www.enermax.co.uk
- Required spec:
Windows XP or later,
Mac OS 9.0 or later



Having external drive bays can be exceptionally useful. It allows you to use bare disks as portable storage and also enables you to quickly swap out drives for testing and cloning. As a reviewer, I used these things daily, but the requirement isn't anything that is exclusively of interest to journalists.

With the rise of the SSD, we're all using many more 2.5" sized devices, even in desktop systems. And both these two products from Enermax acknowledge those changes with the inclusion of support for the 2.5" form factor.

I'll say up front, one of these designs I liked, while the other managed to irk me before I'd finished with it. Let's start with the EMK5402 before moving on to its brother, the EMK5201U3.

The compact EMK5402 contains room for no less than four 2.5" drive mechanisms, in a single half-height external drive bay. To that end, there are four SATA ports on the back corresponding to each bay and two Molex power connectors supporting the four potential drives.

Why these use Molex and not SATA power connectors I'm

unsure, but most systems still have both, so it shouldn't be an issue. It also has two 35mm fans, providing some airflow through all the bays.

Each bay can be individually locked and has an activity LED to show the drive is in use. What's critical to understand if you intend to use something like this is that these bays aren't intrinsically 'hot swap', unless you set the SATA port it's connected to as being 'removable' in the BIOS.

Initially, I thought this was an excellent product that solved the clutter problem I'd personally experienced with SSD testing recently. But then I realised that EMK5402 has a big flaw, in respect of the disk ejection system.

Instead of applying pressure to the sides of the edge connector, it instead applies it to the narrow surface directly above the connector. That is fine if the drive is 12.5mm, and it might even work if it's 9.5mm deep, but can miss the drive



“One of these designs I liked, while the other managed to irk me”

entirely if it's only 7mm thick. That's a shame, because that's the thickness that most SSDs are turning up these days, and

they're unlikely to get thicker any time soon.

The result of this is that I've just sent a lovely SSD back to



Samsung with a lovely scratch, because when I tried to eject it, the drive stayed put and the drive gouged its surface instead.

What I found most annoying about this was that the identical problem addressed differently in the EMK5201U3 copes with any drive thickness perfectly.

In only copying with two drives, one each of 2.5" and 3.5", the EMK5201U3 is somewhat less ambitious in its use of the half height space but generally more successful.

The two drives are serviced by a single SATA power cable, but

you can convert it to using two if you're concerned your drives will demand too much power.

They each have their own SATA data cable, so they can run attached drives at the full 6Gbps specification. As an added bonus, Enermax also included two front-facing USB ports that have the cabling to be attached to a 20-pin motherboard header. And unlike the EMK5402, all size drives eject smoothly from this design.

One extra feature I also really liked was that it has a little power on/off switch, which

could be a boon for those who like to dual boot but don't like to install menus. It's also a much better solution for those who want to use eSATA for detaching/attaching storage while the system is running.

If this equipment has a weakness, it's that Enermax isolated the drive bays from its side mountings using vibration dampers. These allow plenty of movement, so you need to use all eight screws, four each side, to attach it to the case, or it will twist when you try to eject drives and push them home.

It's rated for 50,000 drive exchanges over its life, so once secured to the case it should be fine.

It also doesn't have a fan, though the 3.5 slot is open underneath, so it should get some ventilation if you position it in a bay that hasn't a solid floor.

Other than those minor issues, this is a very serviceable design and one that, when coupled with Enermax's own EMK3104 converter, can easily cope with dual 2.5" drives.

For the problems I've mentioned and its rather high price, I'd avoid the EMK5402, but the EMK5201U3 is certainly worth considering if you have a system where you're continually changing drives of either size standard. It's also much more realistically priced.

mm Mark Pickavance

EMK5402

A neat four bay rack that doesn't like slim drives



EMK5201U3

Elegant mobile rack for two drives with extra USB 3.0 ports



Adata Premier SP610 512GB SSD

A decent capacity, super-quick and ultra-reliable drive

DETAILS

- Price: £169
- Manufacturer: Adata
- Website: goo.gl/ztfq5m
- Required spec: SATA-3 6Gbps, Windows XP or later, for Acronis TI HD installation (internet connection needed for download)



Adata has excelled at delivering high-quality products at reasonable prices. Its expertise in the server and enterprise markets has been applied to the desktop, so we can now enjoy those benefits at home.

One such example is the Premier SP610 SSD, an impressive 2.5" drive with capacities of 128GB, 256GB, 512GB (which we're currently reviewing) and 1TB. It has a synchronous MLC Micron 128Gbit 20nm NAND flash with a new Silicon Motion SM2246EM controller, which itself incorporates a single-core 32-bit ARC (Argonaut RISC Core) processor. This means the I/O requests are handled with extreme efficiency through the use of extra instructions, which in theory should lead to a better overall performing SSD.

The Sp610 does, however, offer a more advanced form of data protection than most other SSDs, with a technology called Advanced BCH ECC. This is basically a hardware error correction code that supports up to 66-bit/1KB from the NAND flash to the controller, and the result is an enhancement of the overall performance and far better reliability.

The reliability is an important factor, as it greatly improves

the confidence you have when RAIDing a number of SP610s. True enough, you could RAID any number of other SSDs, but the extra error correction and improved reliability here offers more peace of mind you wouldn't normally have in a SSD RAID setup – plus you get to laugh in the face of performance benchmarks.

Additionally, the Silicon Motion controller offers an improved low power consumption over other controllers, such as the

Sandforce and Marvell versions. And to complete the package, Adata has included a 7mm to 9.5mm laptop disk bay spacer and download key for a copy of Acronis True Image HD 2013.

In our tests, the Adata Premier SP610 performed magnificently, with an ATTO read speed of 560MB/s on the 8192KB file size test and a write speed of 446MB/s. The 4KB tests saw a read speed of 304MB/s, and a write speed of 282MB/s.

You could delve deeper into the performance charts and benchmarks and carefully note any discrepancies that appear with IO rates, but that would simply be a waste of time, because it doesn't reflect the real-world operation of the drive. Regardless of the numbers the benchmark software threw up, the Adata SP610 was a blisteringly quick drive that had more than enough capacity to house any operating system and installed programs. It's an ideal single laptop drive and an even better system/boot drive for a desktop.

There's good attention to detail here, in terms of the contents of the packaging, through to the type of controller and ECC feature. Adata could have easily released an SSD without any of these extras, but it didn't. This shows a level of commitment to the customer and greatly improves the trust in the company and its products, which is commendable.

The Adata Premier SP610 512GB SSD is an excellent large capacity drive and certainly one you should be considering come the next upgrade

mm David Hayward

A lightweight, high-quality music player, with some useful extras



Transcend DrivePro 100

The only dash cam that rides shotgun with you

DETAILS

- Price: ~£69.99
- Manufacturer: Transcend
- Website: goo.gl/xqoogF
- Required spec: USB port, Windows XP or later, Mac OS X 10.8.2 or later, Linux Kernel 2.6.38 or later



A while ago, we reviewed the Transcend DrivePro 200 and found it to be a worthwhile purchase for those who are behind the wheel for a considerable part of the day.

The DrivePro dash cams are a range of devices that can record a driver's view of the road in high definition and time-stamp the footage. Should an accident occur, then the dash cam can sense the impact and sharp braking through its accelerometer and start an emergency recording. The idea, therefore, is to get video footage of the incident for insurance and police reports.

The DrivePro 100 is a fascinating device. There's a large F/1.8 aperture, a high-quality lens that's capable of recording a wide 130° viewing angle at full HD 1080p, with 30 frames per second, in both day and night, so it can pick up the essential details, such as a licence plate number, should an accident unfortunately happen.

There's a free 16GB Transcend micro-SDHC MLC flash card included with the DrivePro 100, so all you need to do is pop it in, and it'll begin recording up to two hours' worth of driving footage. Included too are the relevant cables needed to hook up the camera to the car's 12V

lighter port and the mounting bracket that affixes to the windscreen of the car.

It's a surprisingly light and compact device, measuring just 68.3 x 63.1 x 34.4mm and weighing a mere 72.6g. The 2.4" colour LCD screen on the back of the camera displays a very good, high-quality and easy-to-use menu system, along with any playback footage of what's currently stored on the SD card. That way, at the scene, officers can view the footage of an accident.

As with its older brother, the DrivePro 100 is capable of continually recording the footage of a journey by writing over an older video file. However, should you wish, you can press a lock button on the side of the camera and essentially mark that particular time-stamped video file as read-only, so it won't be deleted. And of course the three-axis G-Sensor will pick up any sharp or sudden

movements that could indicate an accident and record the details immediately.

The only major differences between the DrivePro 100 and the DrivePro 200 are the wi-fi and TV-out connectivity on the DrivePro 200 and the fact that the lens in the DrivePro 100 is slightly better in low light conditions than that of the DrivePro 200. There's also one extra addition to the DrivePro 100, in that it has a small li-polymer battery built in that can record up to 30 seconds worth of video data after a loss of power resulting from a collision.

Aside from all of this, you're also able to take snapshot pictures at the touch of a button, and you can also mute the sound from the microphone. Beyond that, the devices are virtually the same and offer the equivalent level of quality and the peace of mind that generally comes with having insurance



friendly video footage to back you up should the worse happen when you're on the road.

At around £69.99, the Transcend DrivePro 100 is a very capable and exceptionally clever device that could save you a considerable amount in an insurance claim. Those who drive for a living will undoubtedly recommend a dash cam, and there are plenty on the market to choose from. We think, though, that Transcend has the upper hand here.

mm David Hayward

Plenty of features and worth every penny



World Of Tanks Blitz (Android)

Wargaming.net's armoured fist punches the Android OS

DETAILS

- Price: Free
- Manufacturer: Wargaming.net
- Website: wotblitz.com/
- Required spec: Compatible Android device (see website)

Previously I was a keen fan of *World Of Tanks*, until I realised that at a certain level it became an exceptionally tedious grind.

But when the developer launched *World of Tanks Blitz* on Android, I was curious enough to load the title up and see how the original game translates to tablets and phone hardware.

What is something of a shock is how similar this game is to *World Of Tanks* on the PC, because while it's somewhat cut down, the basic mechanics of armoured combat against online adversaries remains intact.

It's a pruned selection of tanks, and the play areas seem smaller because there are fewer simultaneous players on each side, but the 3D worlds and fighting in them are almost identical. Some levels are indeed shrunken versions, and while the model detail is less for practical reasons, it's not excessively less attractive.

Other concessions include no crew transfer or retention, and while you can store your progress on the same account, it isn't synced with *World of Tanks* (WOT).

This is all good, and in terms of sophistication, this is a million times better than



most Android titles. However, in addition to translating the good parts of the game, Wargaming.net also seems to have been compelled to translate some of the worst aspects and also add some totally new annoyances to enhance player frustrations.

For those that have never played this game, it's fun with the early and easy-to-progress tanks. And once you've mastered the controls, tanks up to tier five or six can be highly enjoyable. Above that it becomes an unbelievable chore, where you're left feeling that you need to buy

gold (micro-payments) to get to the next tier.

On my full WOT account I have tier ten tanks and they took forever to get, and they're no fun to play either.

That's a problem, and when you put something like this on a tablet, you also run into the performance limitations of that hardware and control problems.

Of these, control is the biggest problem, because as a battle-hardened tank commander I should be off to a flying start. But with the touch-based, on-screen joysticks, I was cannon fodder.

My obvious solution was to couple up a keyboard and mouse, but they were entirely ignored by the game. According to a few answered forum questions, they won't do this because those using a keyboard would be 'advantaged'. That's odd, because the identical game on Apple iOS devices is compatible with the MOGA and Logitech Powershell controllers. Without a better control mechanism, you're just road-kill to those with bigger tablets and more dexterous fingers.

As for hardware compatibility, there is a list on the wotblitz.com website, though it might be quicker to see if it appears on your version of the Play store as a better indicator. It's a massive installation (by Android standards) of 2.51GB, so that's another consideration.

If you can master the controls, then be prepared for some transient fun. Just be warned that when you start to consider buying gold or premium tanks to progress, you need stop or at least accept that it is designed purely to make money, not make you happy.

mm Mark Pickavance

World of Tanks comes to Android mostly intact



Transcend JetFlash 790W

An elegant mix of speed and storage in a neat USB flash drive

DETAILS

- Price: ~£49.99
- Manufacturer: Transcend
- Website: goo.gl/QrXGAh
- Required spec: Spare USB 2.0 port. USB 3.0 for maximum speeds

USB flash storage capacities have increased significantly over the last couple of years to the point where 64GB is regarded as entry level. To help facilitate these increased sizes, the speeds of the USB flash devices have also rocketed, taking advantage of USB 3.0.

The Transcend JetFlash 790W is a good example of these vastly improved capacities and speeds. It's a USB 3.0 flash drive or USB pen drive, whichever way you prefer, with a capless, retractable slide-out USB connector and embedded blue LED encased in a touch plastic that comes in either white or black and which measures 63 x 21 x 10.6mm and weighs just 4.9 grams.

It comes in a variety of sizes, ranging from 8GB, through 16GB, 32GB, 64GB and the one we're currently reviewing, a 128GB model. The storage is thanks to a DDR Flash NAND, the same kind you'll find in many SSD drives, which helps keep the speeds up –



especially when used in conjunction with a USB 3.0 port on the computer.

Using Flashbench and the 790W plugged into a USB 3.0 port, we recorded a 90MB/s read value with the 16MB file test and a write speed of 56MB/s. The read speeds remained fairly constant until the 32KB file test, where it started to drop to around 80MB/s until the 1KB transfer

test that recorded a read speed of 8.5MB/s. The same applies to the write speeds, which started to drop at the 2MB file size mark with a value of 53MB/s, right down to the 1KB write test, which saw a recorded value of 0.16MB/s.

The same test while plugged into a USB 2.0 port revealed a steady read speed of 25MB/s for the 16MB file and a write speed of 23MB/s. This dropped towards the lower size file tests to a more sedate 1.2MB/s read and 0.12MB/s write for the 1KB test.

Either way, in real-word terms, this basically means that a 4GB file is capable of being transferred from a PC to the Transcend JetFlash 790W

in around 40 to 50 seconds, averaging roughly 140MB/s, which isn't too bad when all is said and done.

Transcend has designed the 790W to be both splash, shock and dust resistant, to a certain degree. This offers the user a reasonable peace of mind, knowing that it can still function well enough after spending a week in the trouser pocket. However, we're not sure if it'll survive going through the washing machine.

The 128GB capacity is certainly handy, and due to the fact that this is a relatively slim USB stick, it means that your vast music collection can be stored on a single device and plugged into a car's USB port without it being knocked. The same applies for any other USB reading music player, for that matter.

Therefore the Transcend JetFlash 790W is a perfect blend of speed and size. And for about £50, after being converted from dollars, it's not too pricey either.

mm David Hayward

Fast, good capacity, and a reasonable price as well



66 The Transcend JetFlash 790W is a perfect blend of speed and size 99

GROUP TEST

Sound Cards

Sometimes the audio capabilities of your motherboard simply aren't enough for the task you have at hand. Perhaps you want a better home theatre setup or better quality audio when gaming? Maybe you just want to savour every instrument in the band?

Either way, a discrete sound card is the way to go. David Hayward has six to assault his ears with, to see which are best and which aren't worth the bother.

Sound Cards

Asus Xonar DS 7.1

DETAILS

- Price: £32.64
- Manufacturer: Asus
- Website: goo.gl/RHeznx
- Required spec: Windows 7, available PCI slot



Asus isn't the first company that springs to mind when the conversation turns to sound cards, but you'd be surprised at the variety of audio products it has available.

This is the Xonar DS 7.1 sound card, from its gaming and entertainment line of products. It's not quite at the bottom of the rung, hanging somewhere mid-range in the Xonar line-up. This makes it both interesting from the point of view of the audiophile, while still being relatively affordable.

The Xonar DS 7.1 is a thin, low-profile PCI card that uses the Asus AV200 audio processor, which in turn is an updated C-Media CMI-8788 OxygenHD processor. And the digital-to-analogue conversion is handled exclusively by a Wolfson WM8776 for the front channels, whereas a Wolfson WM8766 handles the rear feeds.

To most normal people, though, all that means very little; what is important is the connectivity and how it sounds.

In terms of the connectivity, there are five colour coded

3.5mm ports on the back plate, placed in a row and easily accessible. They can be configured for 7.1 or 5.1 surround sound setups accordingly and further tweaking of the channels can be performed within the Asus Xonar software. However, it's worth noting that we did have some trouble getting this card up and running under Windows 8.1. It and the software worked fine in Windows 7, but 8.1 put up something of a struggle until it finally gave in and started to work.

While up and running, we did notice there was some significant distortion from the setup whenever anything with Dolby Surround Sound was playing. It either didn't work at all or belted out a shrill, deafening noise until Dolby was disengaged and normal DTS stereo to surround was opted for.

A little investigation revealed that although the processing is adequate for stereo to surround, Dolby Surround Sound isn't supported. This of course means that those looking for a true home theatre setup will need to consider another sound card.

Generally speaking, though, the Asus Xonar DS 7.1 delivered some decent audio. It was certainly loud enough, and when running under Windows

7 as opposed to 8 (which despite eventually working still didn't sound right), the quality was good enough for the average-sized living room media centre. The 5.1 setup we used was very good, in both gaming and films, but we did feel that there was still something missing. Perhaps if there was an optical out, then the quality could have improved?

Overall, the Asus Xonar DS 7.1 isn't a bad card. The sound quality is certainly good enough for most users and for most situations and home environments. But if you're serious about your audio setup, and you're trying to cover a larger area, then this probably isn't the card for you. Likewise, if you're using this for a more professional editing setting, then you'll need to move on and find something with a little more power and features.



Creative Sound Blaster Recon3D PCIe

DETAILS

- Price: £43.98
- Manufacturer: Creative
- Website: goo.gl/Waa2cn
- Required spec: Windows Vista or later, spare PCIe slot



Sound Blaster is a name that needs no introduction to the PC user. Its products have been around for as long as the PC itself, and there are plenty of you reading this who will no doubt fondly recall toying around with the Autoexec.bat in DOS to load the Sound Blaster 16 drivers into high memory areas.

Creative's Sound Blaster range have certainly moved on since those early days, and now we're seeing the next generation of sound card audio produced through impressive sounding processors.

The Sound Blaster Recon3D PCIe is the PCIe equivalent of the Recon3D USB external sound card that's compatible not only with PCs, but also consoles including the new generation PS4 and XBox One.

This internal PC only version comes with five 3.5mm ports for 5.1 Dolby surround sound, a dedicated headphone port,

digital optical out and digital optical in. All this is handled via Creative's much advertised quad-core Core3D audio processor that essentially accelerates and improves the audio input/output and takes the weight of such tasks off your system CPU. The end result, in this case, is a main PCU that is freed up to process gaming frame rates or HD content, instead of dealing with the audio as well.

Beyond the hardware, Creative has put a lot of effort in to making the most comprehensive suite of audio drivers and tools available. There's an improved voice processing driver, for those using headsets; THX TruStudio Pro, which will enhance a surround sound setup by adding virtual surround speakers, regardless of the current audio setup, and will allow a deeper home theatre experience.

Naturally there are also many options to tweak the performance and enhance the audio setup. And we're glad to see that the software and accompanying drivers work seamlessly with Microsoft's latest version of Windows.

There's also an interesting addition to the software called Scout Mode, which enhances the sounds made by other players in-game. The enhancement will boost the levels of their footsteps, movements, gunfire and everything else, with the point being that you'll be able to hear and locate them before they can find you. You can look on that as an unfair advantage if you like, but it's a tool that we particularly enjoyed using to great effect.

Sound quality from the Recon3D was very good indeed, probably the best we've heard in a long time. It's the sort of quality and clarity across all the frequency ranges that makes you realise just exactly what you're missing out on when you only use the motherboard built-in sound options.

Gaming, film and TV were exceptional quality, and the sound produced filled the room and made quite an impact on those watching and playing. There was easily enough power fed through this card to fill a sizeable area, and if you're using a good quality set of speakers or headphones, then you're in for a real treat.

All in all, an excellent sound card and well worth the price.

66 Makes you realise just
exactly what you're missing
out on 99

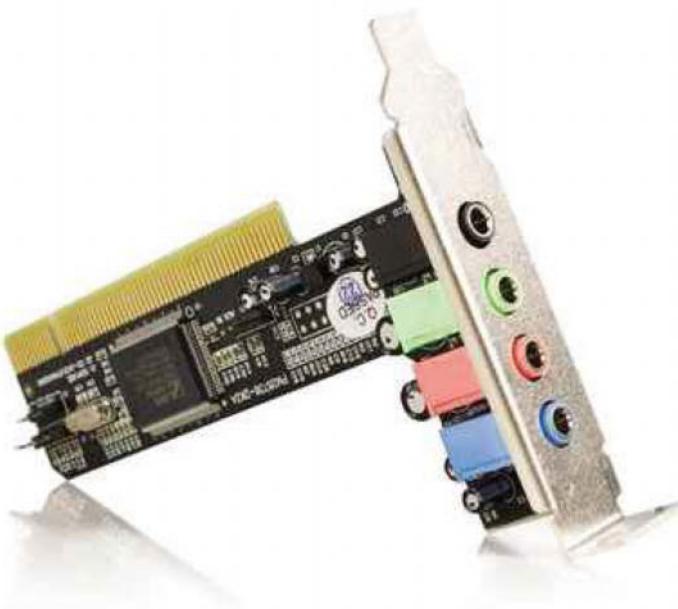


Sound Cards

StarTech 4 Channel Low Profile

DETAILS

- Price: £9.58
- Manufacturer: StarTech.com
- Website: goo.gl/Nw9wnY
- Required spec: Windows 7 or later, spare PCI slot



StarTech may often be regarded as a manufacturer of cheap yet functional PC peripherals, but most of its products do a pretty good job. Or at least, they fill the gap between the ultra-cheap and far too expensive.

The 4 Channel Low Profile sound card it sells is one such example. It's certainly cheap, at around £9.50, and it's not quite on par with the previously reviewed examples, that much we'll admit to. But for what it's worth, it does fill that aforementioned niche.

This is an extremely slim, low-profile PCI sound card that offers four 3.5mm outputs for a four-channel 16-bit stereo setup. The audio is handled via a C-Media CMI8738-SX, which is towards the lower end

of the audio processing range, but it does offer some rather interesting features.

For one, this is a great and cost effective sound card for super-slim media centres, where the system CPU may not be all that powerful and any processing removed from it will aid in the delivery of the content being displayed. There's a 32 Ohm headphone buffer, to help improve the kind of quality you would need when gaming and wearing headphones. And surprisingly, it's also legacy Sound Blaster Pro DOS compatible, with full support for SBPro DOS drivers.

The DOS drivers and support part is at first a very cool feature and one that we certainly liked, since we often have problems when playing older games under DOSBox or through a virtual machine. However, despite this nod to the past, you soon come to realise that it's a little useless by today's standards, especially as most of the games we played are now available from a browser and

can pass quite happily through a more modern setup.

The card and drivers worked perfectly fine under Windows 8.1 and 7, both 32- and 64-bit versions, and when hooked up to a decent stereo desktop speaker set or headphones they performed reasonably well.

Alas, you get what you pay for. And for under £10 you can't really expect too much. Okay, it works and produces sound, but the quality isn't great, and there's a lot of distortion plus some missed notes and sounds when several instruments are playing at once. The balance isn't great either and there's not much you can do when it comes to tweaking or calibrating the audio levels.

We also found out that the card gets exceedingly hot after about a half hour's use. It's not enough to melt any adjacent wires or anything, just enough to make you flinch if you touch it, but it does add a fair amount of heat to the system and if you're using this in the tightly packed space of a small media centre case then you could be in for some heating issues.

While a dedicated sound card for less than ten pound sounds like a fine idea, the StarTech 4 Channel PCI card here doesn't really add anything too promising to what the motherboard already delivers. In all honesty, you're better off with a different product.



Sweex 5.1 PCI

DETAILS

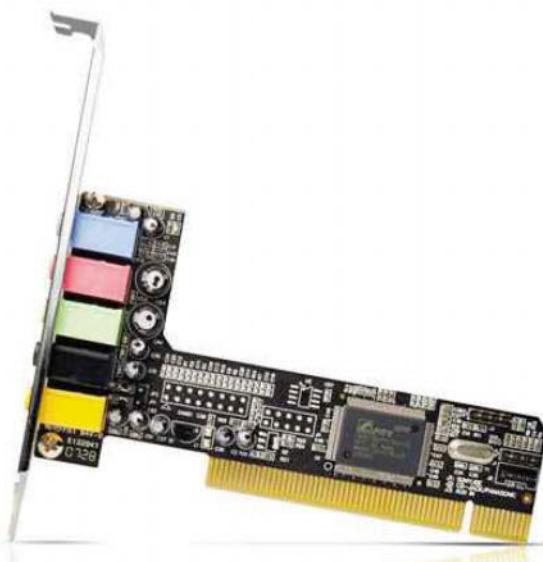
- Price: £10.57
- Manufacturer: Sweex
- Website: goo.gl/aMC4Fs
- Required spec: Windows XP or later, spare PCI slot

Sweex isn't exactly a company renowned for producing top-quality sound-related products, but it does a few internal and external sound cards, but the range is very limited.

This is its 5.1 PCI sound card model, with a 16-bit 3D effect codec, full duplex playback and recording, five 3.5mm jack ports and built-in microphone amplifier for when using headsets. All this is handled by the C-Media CMI8738-LX, a slightly better version of the previous StarTech's audio processor.

With the sound processor being more or less the same, with the exception in this case being the ability to channel to a 5.1 speaker setup, you can expect the same kind of performance and features.

There's an improved headphone buffer, Sound



“ We used the card for about
15 minutes before it stopped
working ”

Blaster Pro legacy support, and it's extremely slim, as the previous model was. There's also a better 3D virtual surround sound feature, but no support for Dolby Surround Sound.

As before, this is an extremely cheap card, and its features and quality are limited by the components used. This is another sound card that gets extremely hot in use for any length of time, an indication of the not-so-good components used, and it's also one that fails quite regularly too.

We used the card for about 15 minutes before it stopped working, and only a full power cycle would bring it back to life again. We did think for a moment that it was a problem with this particular card, but a quick check on various forums revealed that we aren't the only ones having this problem. There are even some who claim the card died altogether after just a month or two of use.



While it was working, though, the sound was pretty dire, especially when fed through a 5.1 speaker setup. There was severe distortion when the volume was increased by just a small amount, and all the frequencies were just dull, lifeless and very unclear. Voice in both film and gaming was horrendous and barely perceivable, which led us to increase the volume and create even more distortion, which made matters even worse.

Overall, we can confidently say that this is by far the worst sound card we've ever tested. When it worked, it was pretty awful, and having one cut out on you after just a short time when active is really unacceptable in this day and age.

Rather than spend the £10.57 on this card, we would recommend you put it toward purchasing a half decent set of headphones and using your motherboard's on-board audio. You'll certainly get a better audio experience, and you won't need to keep restarting your PC to get the sound working.



Sound Cards

Asus Xonar Essence ST

DETAILS

- Price: £148.26
- Manufacturer: Asus
- Website: goo.gl/gxi0b
- Required spec: Windows 7 or later, spare PCI slot plus one extra slot for expansion



This is the second Asus sound card in this group, and it's a step up from the previous model, the Xonar DS. The Asus Essence series of cards and other audio devices are geared toward hi-fi, top-quality sound production, using top-of-the-range components and features to deliver an incredible audio experience.

The Xonar Essence ST is certainly a suitably impressive sound card. It uses an Asus AV100 sound processor, which, like the AV200 in the Asus Xonar, is actually the same C-Media OxygenHD audio processor, with a Texas Instruments PCM1792A for front output D-AC and a Cirrus Logic CS5381 chip

for 24-bit A/D conversion at sample 192KHz sample rates. Beyond that, there's also a Texas Instruments 6120A2 High Fidelity Headphone amp rated at 600 ohms.

This together creates a superb signal-to-noise ratio to reduce the amount of background interference and noise, as well as lowering the distortion of any output channel. The overall effect is

very good, to say the least. There's also the welcome support of Dolby Pro-Logic II, Digital Live, Virtual Speaker and Headphone technologies, along with a 3D Virtual Speaker Shifter for custom positioning and support for the more common 3D sound engine APIs.

Along the backplate you'll find five ports: two gold plated RCA, left and right analogue inputs, then a pair of one quarter inch stereo phone jacks for headphone, line and microphone and finally an RCA for S/PDIF output.

The card features a large shield over the analogue output processors to cut down on any RF interference, which is a black anodised affair that sports a gold emblem of what we think is a tiger, although it could also be a lion, cat, dog or some other unidentifiable creature, along with the Asus logo. The point is that it's a nice touch and shows that some thought has gone into providing a good shield for the best possible audio output.

The hardware, driver and software setup was perfectly

fine, on all the versions of Windows we were testing the card on. It's worth mentioning that the Xonar Audio Centre software was slightly different on the Essence as it was on the DS and allowed us a lot more control and tweaking of channels, sample rates and effects.

Once set up, the Xonar Essence was a superb sound card to listen from. Music, gaming and film were presented with a superb clarity, and thanks to a customised precision clock tuning engine, the quality of the instrumentals was without a doubt one of the best we've ever heard. Additionally, there's also an extension board available for the Essence ST to upgrade it to full 7.1 surround sound output. However, that's available separately, and in this instance we didn't have it for review.

Naturally, this level of audio bliss isn't going to be cheap. The technology involved is quite extreme, the sort of stuff that makes an audiophile get all foamy about the mouth. So while the sound quality is excellent, the price of £148.26 isn't.

Still, if this level of audio is your thing and you have the equipment to make best use of all this power, then you'll no doubt be placing your order already.



Creative Sound Blaster ZxR PCIe

DETAILS

- Price: £182.42
- Manufacturer: Creative
- Website: goo.gl/eI6qnF
- Required spec: Windows 7 or later, spare PCIe slot plus extra space for daughterboard

Since we've had the most expensive card in the group already, in the form of the Asus Xonar Essence, we thought that the rough equivalent from Creative would be in order.

The Sound Blaster ZxR is Creative's flagship, mega-high-performance sound card that uses the same Sound Core3D quad-core audio processor as the Sound Blaster Recon3D, as well as dedicated inputs for high-quality audio and studio-level recording.

This is actually a sound card that comes in two parts, somewhat like the Asus Xonar Essence. The main ZxR board features a pair of quarter inch stereo, line and microphone ports, a pair of gold-plated RCA left and right ports and a



further pair of 3.5mm jacks for 5.1 surround sound setups.

The daughterboard, which incidentally is powered from and connects to the main board via a ribbon cable, doesn't need a spare PCIe slot, but you will need a free backplate slot to fit it into. On its backplate you'll find additional connectivity in the form of another pair of gold-plated RCA ports, digital optical out and digital optical in. It's also worth noting that the daughterboard has its own quad-core Sound Core3D processor.

In among that lot is a Texas Instruments Burr-Brown

PCM1794 DAC to create an awesome 127dB signal to noise ratio, as well as an extra pair of Texas Instruments PCM1798s for digital-to-analogue conversion. The whole setup is connected seamlessly and produces some mighty impressive distortionless sound reproduction, regardless of whether that's through a set of headphones or a full 5.1 surround sound setup.

There's one final part to the sound Blaster ZxR, and that's an external Audio Control Module that connects to the quarter-inch microphone and headphone ports on the main card and allow precise volume control, as well as conversion from the quarter-inch connection to the more common 3.5mm jack.

The software side of things is also pretty impressive. With the same kind of crystal clear voice communications, Dolby Digital Live, THX Pro Studio technology and the rather splendid Scout Mode, there's more than enough for the professional audio technician and enthusiast to get stuck into.

Needless to say, gaming was amazing, as was film and music playback. Everything was perfectly clear, and the

clarity of each frequency was just magnificent and well beyond anything else we've looked at so far, even the Asus Xonar Essence.

As we said at the start of the review, though, this is Creative's leading and cutting-edge sound card, so it costs a pretty penny or two: £182.42, to be exact. Utterly amazing as the sound quality is, that's a little over the top for someone who plays *Battlefield* or *Call of Duty* every once in a while. Sure enough, it'll sound wonderful, but nearly £200 for listening to American teenagers gun you down isn't something most normal folk are willing to splash out for.

For the professional PC audio user, though, the Sound Blaster ZxR is the card you should be listening to.



**micro
mart**

Creative Sound Blaster Recon3D PCIe

We thought the Creative Sound Blaster Recon3D was an excellent sound card that offered a lot in return for a rather modest price.

There was plenty to satisfy the gamer, film addict or those who demand high-quality audio from their setup.

**micro
mart**

Creative Sound Blaster ZxR PCIe

Okay, so £182 is a little steep, we'll grant you that. If you can afford it, though, and you want only the best quality audio, then there's no point in going for something substandard to hook up to your expensive speaker kit.

How We Tested

Each sound card was tested with an MSI Z97M Gaming Board with an Intel Core i5-4670K, HyperX 8GB RAM, HyperX Fury 120GB SSD and Corsair 850W PSU. The operating systems used were Windows 7 64-bit, Windows 8.1 64-bit and Windows 7 32-bit.

The sound cards were connected to a 5.1 Creative speaker setup, a desktop stereo pair of speakers and a set of Roccat Kave gaming headphones. We sampled various games, films and classical music for a range of instruments and voices.

	Asus Xonar DS 7.1	Creative Sound Blaster Recon3D	StarTech 4 Channel	Sweex 5.1 PCI	Asus Xonar Essence ST	Creative Sound Blaster ZxR
Price	£32.64	£43.98	£9.58	£10.57	£148.26	£182.42
PCI Type Used	PCI	PCIe x1, x4 or x16	PCI	PCI	PCI	PCIe x1, x4 or x16
SNR (Signal To Noise Ratio)	100dB	102dB	0dB	20dB	124dB	124dB
Sound Processor	Asus AV200	Sound Core3D quad-core	C-Media CMI8738-SX	C-Media CMI8738-LX	Asus AV100	Sound Score3D quad-core
Digital Optical?	No	Yes	No	No	No	Yes, via daughter board
Low Profile?	Yes	No	Yes	Yes	No	No
Windows 8.1 Compatible?	Needed some work, wasn't good audio though	Yes	Yes	Yes, when it worked	Yes	Yes

Tech Origins

Video Chat

David Briddock tracks the beginnings of video communication

As the telephone network grew to touch every corner of the globe, our planet seemed a smaller place. Despite this, many people still missed face-to-face contact with family, friends and work colleagues. Spotting this opportunity, telecom companies began to divert profits into video telephony technology research.

Videophones

Early devices were just standard telephones with a simple camera and small screen. US-based AT&T started building prototypes as far back as 1927, and by the late 1930s several European post offices offered person-to-person videophone services based on dual-cable-circuit telephone transmission technology.

AT&T's Picturephone service began in the early 1970s: large, cube-like devices that took decades of research and development and cost hundreds of millions of dollars. Despite this, they used poor-quality analogue transmissions and only worked over short distances. A few years later BT, released its own rival, the Viewphone, but again it delivered poor picture quality, and with the growth of personal computer ownership, new opportunities emerged.

ISDN And IP

By the 1990s, videoconferencing systems had migrated almost exclusively to the digital Integrated Services Digital Network (ISDN) and Internet Protocol (IP) transmission standards. ISDN and IP technologies could cope with the large volumes of data generated by high-resolution cameras and multi-point microphone arrays. Adding video compression technology to ISDN and IP permitted PC-based videoconferencing, such as Tim Dorsey's CU-SeeMe application, released for the Macintosh in 1992 and Windows in 1994.

A more famous example is Skype (skype.com), originally developed in 2003 by Niklas Zennström from Sweden



▲ Niklas Zennström and Janus Friis



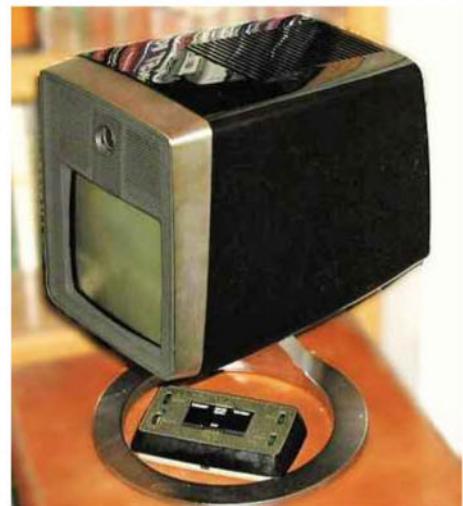
► AT&T Picturephone

and Janus Friis from Denmark. The Skype Corporation was subsequently bought by Microsoft in 2011 for a whopping \$8.5bn, and its software and technology is now an integral part of Microsoft's consumer and business software suite. Skype apps run on most smartphones and tablets, while Skype Qik enables mobile consumers to exchange video messages (as individuals or a group) or record, upload and stream live video. Today, consumers spend well over 200 billion minutes using Skype every quarter.

Business requirements went beyond a simple person-to-person capability, though. Corporate customers wanted interactive team-based communication spanning multiple geographically diverse locations, with the goal being to make it seem as if all participants were present in the same room. Known as 'telepresence', this illusion requires very high levels of video and audio fidelity. While the best of these systems are expensive, they're often found in corporate headquarters, with the high cost being recouped by reduced travel expenses.

From Anywhere

These days, virtually every smartphone, tablet and laptop has a built-in camera – sometimes more than one. This



proliferation of real-time video capability led to innovative, low-cost mobile collaboration apps. Consequently, most platforms are sold with a video chat app.

These modern apps combine video, audio and on-screen drawing capabilities, so you can have real-time face-to-face conversations with family and friends or conduct interactive business meetings, from home a local cafe or wherever you might find a wi-fi connection.

Smart TVs, with their built-in computing power and video cameras, are another way to catch up with family and friends, this time on a big screen and from the comfort of your own settee.

SUBSCRIBE NOW!



Subscribe to **micro
mart** today and save on the single issue price.

Each issue of **Micro Mart** will be delivered directly to your device each week.

SEE NEXT PAGE FOR SET-UP INSTRUCTIONS

HOW TO SUBSCRIBE...

...on an iPad or iPhone

- STEP 1** Return to the *Micro Mart* library
- STEP 2** Choose your subscription term and tap twice on the 'price' box
- STEP 3** Choose whether to create an optional *PixelMags* account
- STEP 4** Enter your *Apple ID password* to confirm



...on a Kindle Fire

Kindle Fire subscriptions come with a **FREE** one month trial.

- STEP 1** Tap 'Free Trial Subscription' in the *Micro Mart* library
- STEP 2** Choose your subscription term from the drop down menu on the popup that appears
- STEP 3** Tap 'Subscribe'

available on
kindle fire



...via the Zinio app

- STEP 1** Search for *Micro Mart* via the search box in the *Shop tab*
- STEP 2** Tap the 'Subscribe' button
- STEP 3** Choose whether to create an optional *Zinio* account
- STEP 4** Enter your *Apple ID password* to confirm



**Subscribe to *Micro Mart* today and
save on the single issue price**

Do You Need A Media PC?



Leo Maxwell debates the pros and cons of using a PC as a DVR and media centre

Broadcast TV, whether delivered via cables or over the air from terrestrial or satellite transmitters, is still very popular in this country, but the modern trend for increasingly fast broadband connections means that some users are ditching TV tuners altogether and moving to on demand media sources. A wide range of devices designed to meet that need are appearing on the market: Chromecast, Roku, AppleTV and NowTV amongst them. The obvious advantage is that you can watch what you want, largely when you want to – which sounds great, there are limits, though.

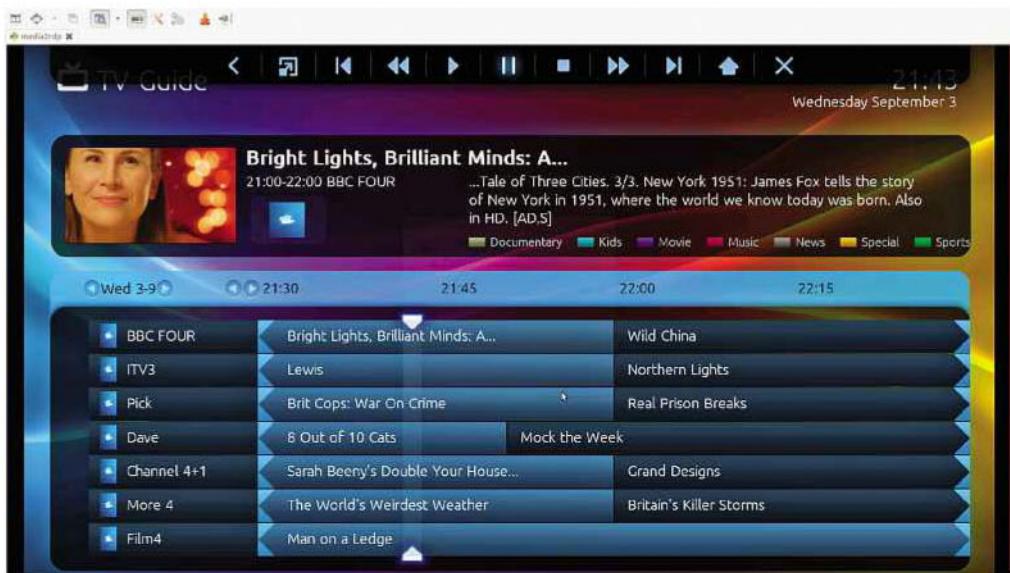
Streaming services such as Netflix or Amazon may only have content available for a limited period, though. The BBC recently extended its iPlayer 'watch window' to 30 days for most content, but some services limit it to just days. Streamed content is not constantly available, nor is it easy to store it offline. Even if the entire visual and audio archive was available all of the time online, not all of us have broadband with the bandwidth to

stream HD media. Some providers cap downloads, some throttle big users and not all networks are reliable.

Not all the online sources are faultless either. Although the big names generally offer a good service if you have the bandwidth, many of the

others on offer can only deliver poor picture and sound quality with endless 'buffering' messages. Sadly areas where the TV signal is poor often coincide with poor broadband provision too, but satellite provides an alternative to both – either via Sky or the FreeSat service.

▼ The EPG from MediaPortal, a Windows application



Watch, Skip, Watch, Skip

Let's face it, although we know that the advertising pays for the content, there is little doubt that most of us would avoid it if we could. In fact in the past there were often peaks in power demand during the commercial breaks in popular programs such as *Coronation Street*, as many viewers used it as an opportunity to put the kettle on. Understandably, commercial on-demand streaming players prevent you from skipping adverts. Even subscription services are not all ad-free.

Which makes one of the biggest advantages of broadcast TV over on-demand content the 'skip forward' button. I personally always watch commercial TV time-shifted, simply because it means I can skip forward to avoid advertising. Shameful, I know, but in my defence, I have never paid any attention to them anyway.

In time, IPTV will almost certainly replace most broadcast TV, but at present a large percentage of us still want direct access to terrestrial TV and the ability to record it for watching or (re-watching) in reasonable quality at a time of our own choosing, whether that is days, weeks or months later. How we do this is largely a matter of which hardware and software options we choose. Having made the decision to record Broadcast media, we need to choose between proprietary PVR (Personal Video Recorder) or PC-based solutions.

Simple Vs Functional

There is always a balance to be struck between how much a device can do, and how easy it is to use. Every added feature means a little more complexity. PVR devices are generally simple to use, compact, energy efficient and mostly maintenance free, but they are generally more limited in terms of access and flexibility.

Due to hardware stream decoding and image processing these devices have low power requirements. A 1GHz processor and 512MB of RAM are more than adequate to handle two HDTV streams along with the generally narrow additional functionality they provide. In contrast, a media PC offers much greater flexibility and can fulfil multiple roles, albeit at the cost of increased complexity and higher performance requirements.

Media PC Or PVR?

I have used the Humax YouView T2000T PVR and a self-built Mini-ITX PC running MythTV or MediaPortal software as examples in the table below. There are obviously other hardware and software products available, which offer greater or lesser functionality. If you don't feel a pressing need for any of the features marked with an 'X' in the right hand column, then a dedicated PVR might well suit you.

Feature	MiniITX media PC Using MythTV or Mediportal software	Humax Youview DTR-T2000/500GB PVR
Tuners	Multiple	2
EPG Range	Eight days	Eight days plus seven day 'Scrollbar'
IR remote	✓ (various types)	✓
Max simultaneous recordings	Only limited by hardware and software, Multiple channels per tuner possible	2 (1 per tuner)
Manual recording	✓	X
Recording modes	Multiple	Episode or series
USB playback	✓	X
Web interface	✓	X
Android App	✓	For scheduling only
On demand TV	✓ (multiple players)	✓ (7 players)
Pause Live TV	✓	✓
Premium or encrypted content	X	Depends on supplier.
Storage	Expandable	500GB (fixed)
Music player	✓	X
Photo Slide-show	✓	X
Video Player	✓	X
Web browser	✓	X
File server	✓	X
DNLA server	✓	X
Multiple Network clients	✓	X
Install applications	✓	X
Hardware expansion	✓	X
Interface	Customisable	Fixed
Backups	✓	X
Format shifting	✓	X
Power use, standby	Less than 1W	Less than 1W
Video outputs	Typically HDMI, DVI, VGA, Composite, Aerial passthrough	HDMI, Composite, SCART, Aerial passthrough
Audio output	Typically TOSlink, SP/Dif, HDMI, Analogue surround	TOSlink, SP/Dif, HDMI, Analogue stereo
Power use, operational	25W or higher, depends on hardware	18W
Maintenance	Complex configuration, higher maintenance. Manual updates	Simple configuration, low maintenance, Automatic updates
Cost	From about £200 for Linux, £280 for Windows	Around £200

“ Understandably, commercial on-demand streaming players prevent you from skipping the adverts ”

In the past even custom-made media PCs have generally been quite large, with higher energy requirements and often noisy cooling fans, but nowadays a PC can be fitted into very compact enclosures. An energy efficient CPU/GPU combination can obviate the need for active cooling. Some smaller cases have external power supplies and VESA mountings so they can actually be fixed to the back of a TV or Monitor, with USB tuners to avoid the need for PCI card.

Software

The software in a PVR is, by nature, limited to whatever software the manufacturer supplies with the device – though there may perhaps be an app store for free or paid-for add-ons. Of course, a media PC – not being limited to a single purpose – is infinitely more customisable.

There is a wide range of media software available for PCs, including Windows Media Player and many other solutions such as VLC or Plex. I have in the past used two free open-source solutions, MediaPortal on Windows, and MythTV on Linux – both of which were polished, mature projects that worked very well. I will be looking at them in more depth later in the series.

▼ This MSI barebone unit housed an AMD dual core processor, 4GB of RAM and a very large heatsink and fan. It was more than twice the size of the Humax unit

Moving Up To HD

This project started when I needed to replace an ageing living room media PC. There are many PVR solutions on the market, but Humax consistently score highly in reviews. I purchased the YouView branded version, which is essentially the Humax T2000T PVR with all the main CatchupTV applications built in. Some PVRs have more features, in fact the Humax in its standard incarnation has a Web Portal, USB playback, DNLA Streaming and a bigger app store.



▲ This Android unit is a similar size to many media streamers. It can also function as a media front-end in your living room



The biggest redeeming feature of the YouView box is the 'scrollback' EPG, which allows you to view available output for seven days in each direction, and launches the correct Catchup player for programmes shown in the past seven days. This is nicely integrated, but some shows are unavailable in the 'past', notably most films (presumably due to rights issues).

Content Choice

YouView devices offer the entire range of FreeView channels. BT or Talktalk customers who receive one with their subscription can also access additional premium content, as can those with Sky+ or Virgin Tivo devices. The only 'premium' offerings at present available to retail YouView customers are Sky's NowTV and the Sky store.

These streaming channels and many others are also available on a mix of platforms including PCs, Macs, Android and iOS via apps or websites. Many 'Smart' devices such as TVs and Blu-ray players support some of those listed below and often several others. TV tuners for PCs cannot usually access encrypted premium channels, and lack access to the Freeview 'Smart' EPG. Streamers And Catchup Apps.

There are currently seven Catchup apps on the Youview platform. S4C and STV apps are available in Wales and Scotland respectively. iPlayer

Unless you've been living under a rock for the last few years, you will know what this one does. Arguably the best on-demand media service available, it hosts all of the BBC TV and Radio output.

ITV Player: Usable ITV catchup offering, covering the ITV channels.

4OD: Channel4's catchup player, recently relaunched to support all of the company's output.

Demand5: Catchup app for the Channel5 brands.

Milkshake: Channel5's preschool offering.

UKTV: Covers the UKTV channels Dave, Really and Yesterday.

QuestOD: Quest TV's catchup

Sky NowTV And Sky Store: NowTV is Sky's subscription service, it is also available on many devices including the NowTV box, (a branded RokuLT available for £10). Subscription at £7 a month or by buying period passes for specific services such as movies or sport.

The Sky Store offers single on-demand movies and TV episodes for purchase. During the compilation of this article, Netflix's popular subscription streaming service was added to the YouView Lineup. Amazon Prime Video and Blinkbox are still notable by their absence, although that may change in the future. FreeSat with its FreeTime EPG offers a slightly different package, replacing the Sky offerings with Curzon Home Cinema, and currently lacking UKTV, QuestOD and Milkshake!

At first, I was very pleased with it, but after a while I became aware of the limitations of the PVR compared to my old box.

Storage on a PVR is obviously limited to the hard disk supplied with it – and, although some offer USB or eSATA ports, content is often encrypted. This means that archiving from most PVRs is only possible by using another device, such as a Hauppauge HD-PVR unit to record in real-time from an HDMI output to a PC. A dedicated media centre PC may be able to ‘format shift’ content to DVD or Blu-ray for backup purposes.

The main advantages of the PC platform that became apparent were flexible scheduling, and the ability to record more than two channels at once. For example, setting a series record on the Humax records the whole series if there is the space to do so, but on the MythTV box I can set it to record one copy of every episode of any given program – and it will do that forever, regardless of what series of the show the episode comes from. This means it can pick up missed episodes when they are on as repeats until the complete run of the show is recorded.

Although the YouView catchup functionality makes up for some of that, it is quite limited in comparison. The main catchup applications are all available on an increasing number of alternative platforms, so it’s a functionality that’s easily replaced. After a fairly short timespan, I found myself getting frustrated with the limits of the Humax and decided to augment it with a new low-power PC to function as a back-end server. As a bonus, my media PC does not necessarily need to live under the TV, it can be hidden away elsewhere, and I can stream content to a small device connected to the TV or indeed any device on my home network.

A dedicated PVR may score highly with regard to simplicity and ease of use, and for some people that will be enough, but the scope of features a home media PC can offer makes it a winner for me.

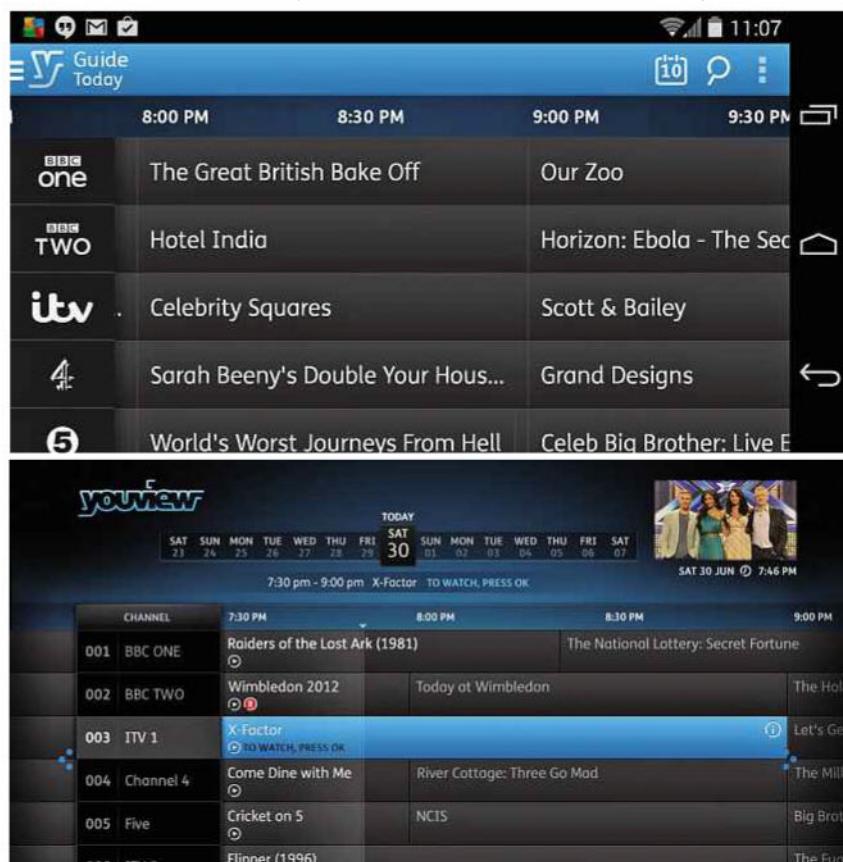
In an upcoming article, I will look at building a multi-purpose media PC and what that entails. **mm**

TV Licensing Rules

If, like a growing number of consumers, you are considering dropping broadcast TV altogether, then you need to know the rules on whether you need a TV licence or not. The law states that you need to be covered by a TV Licence if you watch or record television programmes, on any device as they’re being broadcast. This includes TVs, computers, mobile phones, games consoles, digital set-top boxes and Blu-ray/DVD/VHS devices. It even includes online channels such as TVCatchup and FilmOn. One small oddity is that if you watch TV on a mobile device such as a phone or tablet, you are covered by your TV licence while away from home, unless you do so with it plugged into a mains charger!

You don’t need a licence if you don’t use a device to watch or record television programmes as they’re being broadcast – for example, if you use your TV only to watch DVDs or play video games or you only watch ‘catch up’ services such as BBC iPlayer or 4oD. The TV Licensing Authority now assumes that all households have a TV. If you are sure you will not watch or record television programmes as they’re being shown on TV, you may need to complete an online declaration. This declaration is used to keep the TV licensing database up to date and means you shouldn’t receive the letters they send to unlicensed addresses for at least two years, although they may visit to check. If you are not licensed when you should be, you could risk prosecution and a fine of up to £1,000.

▼ The Youview app, which really works better on phones or tablets with larger screens



“ The modern trend for increasingly fast broadband connections means that some users are choosing to ditch TV tuners altogether ”

Has Google+ Succeeded?

No, **James Hunt** hasn't had a bit too much cheer over new year. Hear the man out...

When Google announced the launch of its own social network, Google+ (Google Plus), it's fair to say that it was treated with some suspicion. Sprung on a largely unsuspecting public in 2011, on the surface it appeared to be a late-in-the-day attempt to create a Facebook-esque social network from a standing start – something that'd be a tall order for any company, regardless of whether they're one of the biggest online brands around or not.

Calling it an uphill struggle would be an understatement; when Google+ launched, Facebook was just cruising past the 800 million user mark and has since crossed the one billion user barrier. Even though products like Gmail, Android and YouTube all had their own large user bases, convincing those people to join another service was going to be difficult, if not impossible.

Many wondered why Google would want to set up a social network in the first place. Toppling Facebook seemed practically impossible from

the start (and seems even harder now), and its attempt at launching a Twitter-like product – Buzz – ended with the service being shuttered in embarrassment. So why was Google+ considered worth doing?

There were (and are) a few obvious potential benefits: maybe Google wanted to siphon off some of the advertising eyeballs Facebook is famed for; maybe it wanted a way to consolidate and cross-pollinate existing services; maybe it just wanted to make it clear to investors that it wasn't ignoring the competition when it comes to providing users with a social platform. In truth, it was probably a little of all of these things that affected the decision.

The big benefit of Google+, though – arguably the reason it exists at all – is linked to these factors but is actually a side-product of them, and it changes the very narrative of Google+ from being a failed social network to a hidden success. It also explains why Google+ still exists in the face of disinterest, and why it probably won't go away any time soon.

The Failure Of Google+?

Before we attempt to convince you that Google+ isn't a failure, let's have a look at why many pundits and punters think it's underperformed. Ask people with an opinion on the matter and they'll probably tell you that Plus has been a flop; that, while it was supposed to be the next Facebook or Twitter, it ended up being the next MySpace – a mostly dormant network filled with abandoned profiles that were set up during an afternoon of intense interest and then immediately forgotten about.

Indeed, when you log in, there's a good chance the only posts you'll see from people you know are those wondering aloud whether anyone's still reading it, or those mentioning that Facebook/Twitter are currently inaccessible. Hardly stuff to get excited about.

The problem with starting a social network, is that you need to have enough people on it to actually be social with. People go where their friends are. Once a person is wedded to Facebook, Twitter, or any other

Google+

social network, it's astonishingly difficult to get them to jump ship. You can tempt them with features, offers, exclusive content and more, but ultimately, they prefer to hang out with their friends. Trying to convince people to move to a social network where they don't know anyone? You might as well be trying to convince them to move to Jupiter.

That goes double if the social network you want them to move to isn't even offering anything new. On its launch, Google+ was criticised for its poor interface and confused security controls, but that's par for the course. It only had one really big problem: it looked as much as like an alternative to Facebook as it could, but it wasn't doing anything Facebook wasn't. All it had to set it apart was the distinct disadvantage that none of your friends were using it.

Since that time, Plus has been given at least two major redesigns and Google has grown the user base by integrating it closely with their other products. Like Microsoft's aggressive marketing of Bing as a credible rival to Google's Search product (despite indications to the contrary), Google ploughed all of its resources into making Plus viable in the long term, even if short-term reaction was unenthusiastic. To ensure the

Google Projects That DID Flop

Google+ might be seen as one the company's flops, but that's only because you're looking at it wrong. By comparison, here are some of the Google projects that really didn't succeed, no matter how generous you're being.

Google Lively

It only existed for a six month period in 2008, but Google Lively was a *Second Life*-style virtual environment that allowed avatars of 20 people to converse in a single room. It sounds like a great idea – straight out of 1996. However, as it came more than a decade late, the service was killed so quickly that most people have never even heard of it.

Dodgeball

Launched in 2000, Dodgeball was a location-based social network that was acquired by Google in 2005. It was along the lines of FourSquare – an early mobile service that used text messages rather than a smartphone data connection. The founders quit Google in 2007 calling their experiences there "incredibly frustrating" and the service was replaced by Google Latitude in 2009. Latitude itself was closed in 2013.

Google Wave

To this day, there are people who built Google Wave who would probably struggle to explain what it was actually for. Google seemed confident that Waves would soon replace emails, but the fact that these mixed-media, multi-directional conversations defy any simplistic explanation probably didn't help. Released in 2009, the Wave product was sold to Apache in 2010.

Google Buzz

In February 2010, Gmail users were surprised to find their accounts now included a 'Buzz' link, allowing them to share status updates, photos, videos and links. Essentially it was Twitter, or a Facebook Wall, but in your Gmail account. No-one wanted it, they were upset that it was forced upon them and its privacy was as bad as it gets. Google closed it 18 months later, to the disappointment of literally no-one.

NEWS SCIENCE & ENVIRONMENT

Home | World | UK | England | N. Ireland | Scotland | Wales | Business | Politics | Health | Education | Sci/Environment | Technology | Entertainment & Arts

17 November 2014 Last updated at 21:32

14 Share

f t e-mail

Top Stories

Share this page

Delicious

Digg

Facebook
10

Google

LinkedIn

Reddit

StumbleUpon

Twitter
4

[Read more about these links.](#)



Kassig family: 'Our hearts will mend'

K must stick to economic course

China sees Philae's hairy landing

UK action on UK bird flu case

Church approves women bishops

Tributes



Band Aid 30

A clickable guide to who's who in the line-up



Lego wars

Big Bang tops Dr Who in fan-created kit clash



'I was disgusting'

Inside the mind of a convicted Twitter troll **NEWSBEAT**

Comet landing: Where next for Philae mission?



By Paul Rincon

Science editor, BBC News website



service continued to grow, Google made it actively hard for its users to not have a Google+ account. On YouTube, Google restricted feature access for video uploaders who didn't have their account connected to YouTube. It caused consternation, but it clearly didn't kill YouTube. Even if you dodged that requirement, it did similar things to Gmail, Maps, even web search to an extent. Google+ became more than just a product launch – it was a new ideological imperative for the company.

If you need evidence for that, look no further than the fact that Google integrated Plus profiles into search results, showing profile pictures next to articles written by members who had properly connected their accounts. It put '+1' buttons on, well... everything. It even shut down services which might compete with it (like the much-missed Reader), and it shared Plus resources with other popular properties, like Google Talk and Blogger.

In one sense, the strategy worked. There are over 500 million profiles on Google+ and it's become the second most populous social network after

Facebook. Look closely, though, and it's a virtual wasteland. Estimates suggest that more than half of all Plus accounts are inactive and ignored.

Which brings us back to the matter of how it could possibly be considered a success. If you're trying to use it like you'd use Facebook, it's demonstrably not working. So why would anyone want to build a social network that doesn't have any social activity on it? The answer to this question is what reveals the secret behind Plus' continued existence. The service might look like a failure from the perspective of users, but clearly Google doesn't think so, otherwise it wouldn't have kept it open. When recent products like Buzz and Wave failed to catch on with the public, they were quickly shuttered. You might not like Google+, we might not like Google+, but Google evidently does. Something is keeping it alive, but what?

The Success Of Google+

The secret of its success is that, really, it wasn't ever supposed to be Facebook. Sure, it looked like Facebook, and it acted like Facebook, and it did everything it could to

replace Facebook in your affections.

That was just a facade, though.

Google+ was built to be the thing that Facebook only became later on: a platform for gathering and deploying user data. In April of this year, Vic Gundotra – the man often called the father of Google+ – left the company. As well as building the service "from nothing" (in the worlds of Google CEO, Larry Page), Gundotra was a huge champion of it within the organisation. At the time, industry gossip specifically pointed to the fact that with Gundotra gone, Google+ would no longer be developed as a product in its own right, and its developers would move elsewhere within the company. While the de-emphasis of Google+ was denied, the product has been notably static for much of this year, with far fewer new features being rolled out than we had seen in previous months.

Arguably, that's because the service doesn't need new features. At this point, over 500 million users have been forced (or, let's be fair, 'legitimately convinced') to create a Google+ account. Google's +1 buttons are now part of the social

web. This means real reason Google wanted its own social network has come to pass: they can now track what you're doing online, even when you're not on a Google site.

This is the secret behind Plus. Whenever you visit a site with a +1 button while your browser is also logged into Google+ (or Gmail, or YouTube, or any other service that uses your Plus profile), Google can tell that you've visited the site. They don't collect your name (because it's not important) but its analytics knows that

someone of your age, gender, location and social profile visited that page at that time, whether you clicked the +1 button or not. That information can then be used by advertisers through Google's ad network to target the right adverts at you.

If you want to know how that works, here's a very basic example. Imagine, for example, that you visited a website for surfing enthusiasts. It's not hosted by Google, it doesn't contain any Google adverts, and you don't get

to it through Google search. In the past, Google wouldn't know that you'd visited the page. It might have no idea that you like surfing at all.

However, should the owners put a +1 button on that page, it'll hit Google's servers when you visit to check you're logged in. Suddenly it knows that you visited a surfing website, that you did it in your lunch break and that you didn't buy anything. Google can then tell its advertisers, who can pay to ensure that every day on your lunch break, you start seeing adverts for surfing gear.

You've probably noticed this sort of thing happen. Chances are that, when you get an advert for a site you just visited, it's not chance at all. It's more likely that you're being deliberately targeted by this kind of aggressive, data-driven marketing. It sounds sinister, but it's really not as bad as it might be. This sort of behaviour is the reason social media sites allow you to use their services without paying: they can use data about you to give their advertisers the best chance of making a sale, which means you're more valuable to them as one of millions of free users rather than one of a few paid customers. Twitter does it, Facebook does it, and Google+ does it.

What makes Google+ different from Facebook is that Google+ doesn't just have access to your browsing behaviour, it's got access to your maps searches, to your YouTube history, even (to some extent) your emails. Facebook and Twitter can only dream of having that level of insight when developing user profiles.

It's not exactly a big deal that social media is about advertising. This quarter last year, Facebook made \$2.3 billion. The difference is that Google made \$14 billion. As advertising platforms go, that's colossal. Google+ wasn't developed to get people away from Facebook – it was developed to make Google better advertisers, and that's what it's done.

This, ultimately, is why Plus has been a success for Google: it's all data in the pot. You don't have to use it. You don't have to like it, but by integrating it with all of its major services, it made sure you did have to at least join it. That's all Google ever wanted you to do. Anything else was a bonus. **mm**

The screenshot shows the Google+ Explore interface. At the top, there are tabs: All, Friends, Family, More, Mentions, and Explore (which is underlined). Below this is a large blue header with the text "Explore Google+" and a decorative graphic of various icons. Underneath, there are two columns of categories:

What's hot		Nature	
Art & Design		Photography	
Automotive		Science	
Food & Drink		Sports	
Gaming		Technology	

Below this is a search bar with the placeholder "# Explore a hashtag".

Further down, there's a post from a community called "Friends of NASA". The post is titled "Rosetta and Philae lander (Pre-launch) | European Space Agency" and includes a caption: "Flight model of the Rosetta spacecraft being transferred within the ESTEC Test Center for acoustic and vibration testing in April 2002. Its folded solar wings can be seen on either side of the main box-shaped hull, with the Philae lander—which Read more (11 lines)".



Stocking Your Mobile Library

Android And iOS Ereader Apps

Shaun Green takes a look at the options for bibliophiles looking to go digital...

Ebooks are big business today. That said, they're a far cry from the digital 'success' stories such as music or streaming video services (the whole financial situation within both markets is the topic for another article, mind you). Ebooks took a long time to get any traction in the market, as did the ereaders that we were supposed to use to read them. Indeed, it was the smartphone and tablet booms that really saw digital books come into their own.

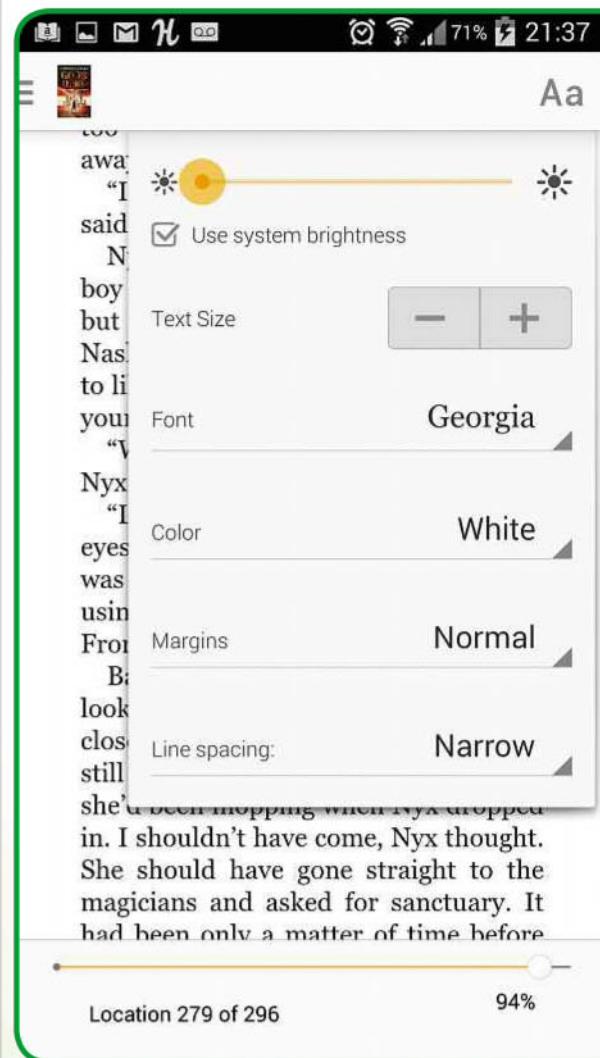
Even that growth period has now largely levelled off, leaving ebooks representing around 25% of total book sales. As with so many new

technologies, it turns out that the new won't replace the old so much as find a natural balance with it.

Yet the success of ebooks is still such that a lot of competing apps and storefronts – even sales models – have appeared, as companies attempt to capitalise upon it. To British readers this could seem like a return to the days before Waterstones and Smiths were the only booksellers on the high street – when Borders, Ottakers and numerous independent shops could still be found around the country. Of course, increased choice means decisions must be made about where to shop – and where to read.

Kindle

Amazon's Kindle needs little introduction; Amazon virtually invented the online bookstore, played a key role in popularising ebooks, and sold one of the first successful ereaders. No other brand name in this sector (and few anywhere) is as widely recognised as Kindle, and Amazon are a dominating force in online retail. The Amazon ebook catalogue is, frankly, enormous, and whilst specific numbers are difficult to come by (it will only go as far as to say "millions" of books are available), it's undeniably... big.



▲ It's important to keep display customisation options on-screen for maximum convenience

66 No other brand names in this sector (and few anywhere) is as widely recognised as Kindle

The Kindle app offers all the features you'd expect as a reader, including all-important and extensive customisation around presentation, including text size, font selection, and margin and line spacing settings. You can also search within your books, highlight passages and leave notes, and the app by default uses cloud synchronisation – which includes recording your position in various books between multiple devices. Much of this is basic ereader functionality, but when it comes to reading it's important to start with the basics!

Page transitions are quick and sharp, with the app proving responsive throughout (though this will, of course, differ from device to device). One of the Kindle app's more unique features is its progress meter, which appears along the bottom of the screen. This informs you of your percentage progress through the current chapter alongside an estimated time remaining for the same (calculated based on your own reading speed). Although some might find this a distraction, it's also quite a

useful feature for reading on the go. Commuters, for example, might appreciate the knowledge that they can reach the end of their current chapter before their stop. In truth, if you don't want to use it, it doesn't take long to stop noticing it is even there.

The Kindle storefront, accessible through the app, is surprisingly workmanlike, but – like Amazon's regular website – is beginning to feel rather dated. User experience considerations aside, though, it's speedy, the search function works well, and the app's home screen makes good use of Amazon's recommendation algorithms. Happily, it manages the latter without obnoxiously pushing its attempts to sell right into your face.

Drawbacks to the Kindle app are its limited support of file formats, with

only .mobi, .pdf and .txt supported, placing limitations on the importing of non-Kindle ebooks. It's also important to note that Amazon restricts its ebooks using proprietary DRM, so reading them using other apps or devices can be a challenge (this is true of most of the big booksellers, although some use app-transferable Adobe DRM). There's also an ethical dimension to consider, with Amazon having taken a lot of criticism in recent times over its corporate behaviour, working practices and more.

Kobo

The Kobo brand has a multinational history. Originally a Canadian business that branched out from a bookstore chain, Kobo was later acquired by the Japanese conglomerate Rakuten (the very same who bought and changed the direction of [play.com](#)). Nowadays Kobo run an online bookstore and distribute ereader devices via partners in different countries around the world. Here in Britain, they work with WH Smith – a name with some serious history.

The Kobo catalogue is surprisingly diverse, and on a few occasions I've found books listed on it that I struggled to find elsewhere – books from small British imprints, for example. This, presumably, is an advantage to Kobo's alliances with 'local' retail companies. They claim to offer over four million books in total.

The Kobo app is a mixed bag, with plenty to like and a little to dislike about it. Let's start with the good: it's quick to run and load books, whilst page transitions are similarly snappy; it offers a decent mix of text customisation features – although you can't adjust margins or line spacing; it has solid note-taking and annotation features and allows you to share public notes – great for book clubs and academics alike.

A little more contentious is the app's use of social components. Users can sync Kobo accounts with Facebook to share and see others' reading activity. There is also a 'Reading Life' screen that presents various statistics on total pages read, total read time, and averages derived from the books you've read. Frivolous, perhaps, and easily ignored, but for those who do like to be social around their reading – [GoodReads.com](#) users, say – a big plus.



▲ For dedicated bibliophiles, reading on the go is important

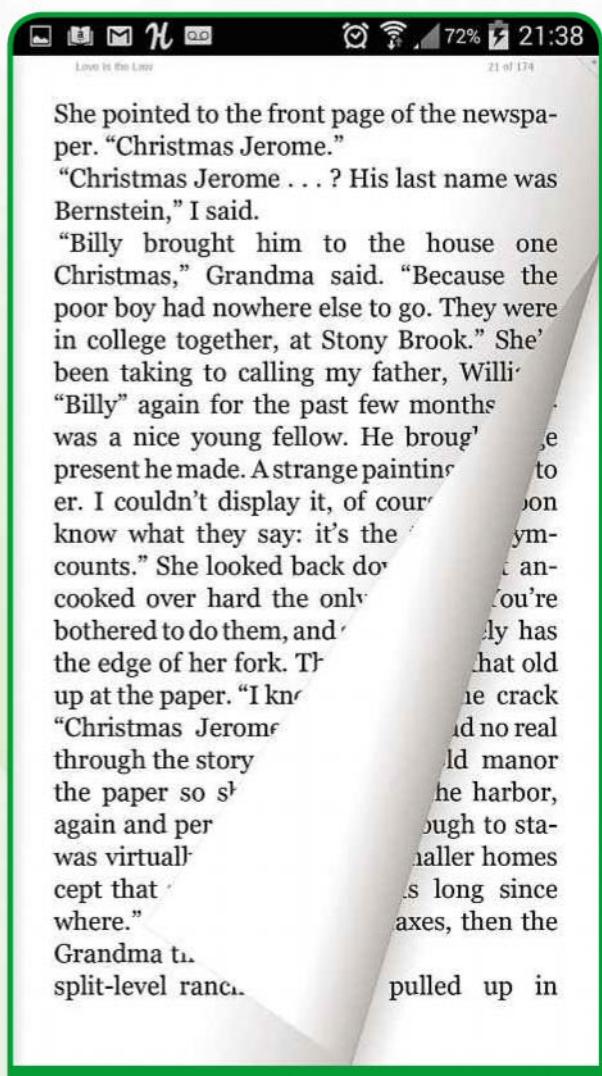
The Home page won't be to everyone's taste, though. It's a two column mish-mash of various blocks including recent reads and store promotions. When reading there are no page transition animations – opinions vary on how important those are – and, we're sad to say, we've experienced some app instability (although relaunches are quick). Kobo supports .epub, .html, .rtf and .txt, although it excludes .pdfs, .mobi and various other formats.

Nook

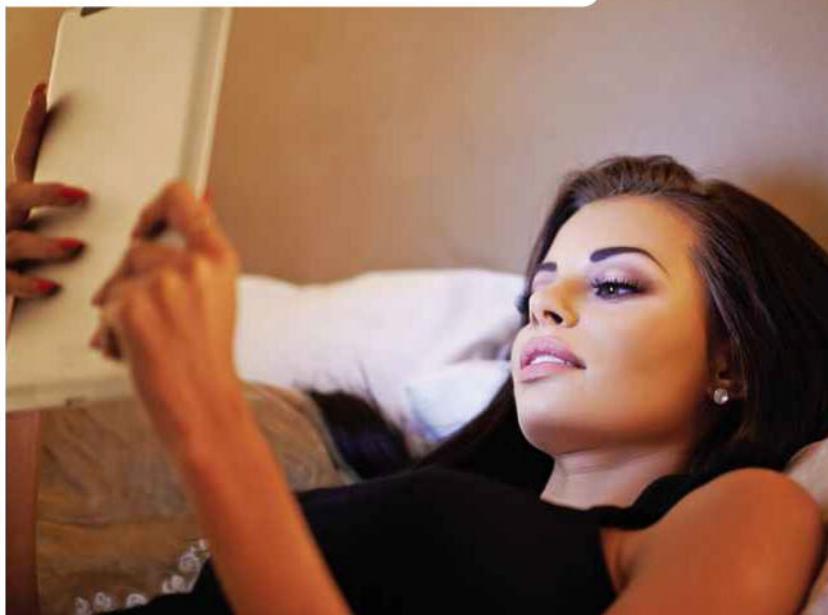
Like Kobo, Nook comes to us from North America – though this time it's the US of A rather than Canada. It's the brainchild of Barnes & Noble, the largest retail booksellers in America. Also like Kobo, Barnes & Noble's Nook has retail partners in the form of Sainsburys, Argos, John Lewis and ASDA. These are evidently not bookshop chains, but fortunately Nook has also partnered with academic bookshop Blackwell's and the London chain Foyles. The Nook UK store claims to offer over 2.5 million titles. This isn't bad for a UK operation that many suspected was to be wound up back in 2013, after the prices of Nook ereaders were substantially slashed.

Despite a well-stocked catalogue, the Nook app is a mixed bag. It's powered by Adobe technology and can, in places, prove a little sluggish. There is plenty to like about it,

▼ Being able to 'peel' pages from the corner is one of our favourite aspects of the Nook app



Tablets can be a great way to read in bed - if they're not too heavy



though, from minor touches like the page-turn animations (which, like Google's offering, allow you to 'peel' each page across the screen should you so wish) to more significant decisions like the way the home screen focuses entirely on your library of books (i.e. it does not upfront push sales, specials or recommendations upon you).

Customisation options are fairly rudimentary (font size, type and brightness) and a standard set of annotation options are present, alongside the expected search functionality. One rather nice touch is the way the contents screen for a book also lists all of the notes you've saved – something it has in common with the Kobo app.

Browsing the Nook store via the app is not a great experience; exploring books by genre or category can be tricky, as the pre-defined filters are largely about new releases or special offers. If you'd like to browse, say, crime thrillers or science fiction, you're better off using the website – which isn't ideal. Even where you can find a suitable category, sub-filtering or ordering options are noticeable

by their absence. Searching, at least, works well.

Despite the limitations with in-app shopping and the limited features of the app itself, the Nook app does make for a pleasant, unadorned reading experience, and sometimes this is all you need. Although 2.5 million books is well below what Google and Kobo offer, it is still an impressive number. A shame, then, that at present it only supports .epub – although Barnes & Noble claims to be evaluating adding more support.

Play Books

As with so many Google services, its efforts to maintain consistent branding come out awkwardly. How, exactly, does one 'play' a book? Still, at least it's better than 'Google Play Music All Access', its tongue-twister of a Spotify competitor.

Fortunately, whilst Google's universal branding may not be up to much, its software engineering and user experience is top-notch. Ebook pages are clean and allow you to focus entirely on the text, whilst animated page transitions simulate actual pages turning – cosmetic

“ The Nook app does make for a pleasant, unadorned reading experience, and sometimes this is all you need ”

More Apps To Try

There are plenty more popular choices available that we've not had the opportunity to cover in as much depth, but we couldn't go without at least mentioning them in brief. We're only covering these in short because they're available for only Android or iOS – not both!

Aldiko: There are a number of similarities between Aldiko and Bluefire: like Bluefire, Aldiko makes use of the Feedbooks store, and allows you to import your own ebooks (including those using Adobe DRM). Unlike Bluefire, it's available for Android only, but also uses the O'Reilly and Smashwords stores, making it a great choice for techheads and fans of small presses (although, be warned, Smashwords also includes self-published works of dubious quality).

Moon+: an ambitious and generously-featured app, Moon+ offers more functionality and customisation options than just about any other Android ereader. This makes it great for power users – and less great for casual readers. The free version is also ad-supported and lacks some features, although £3 for the full version is not bad – and less than half the price of a new paperback. Books can be acquired via Feedbooks, Smashwords, Project Gutenberg and more.

FBReader: a free, open source app for Android, FBReader supports a wide variety of file formats, and integrates a good number of stores (including, once again, Feedbooks and Smashwords). Although it's probably the least slick ereader app we've seen, it works well, eschewing cosmetics and advanced design in favour of a pure and simple experience.

iBooks: Although its ebook sales aren't as impressive as, say, Amazon's have been, Apple have performed impressively in the sector without making much fuss about it. The success of the iTunes store and the App Store have essentially carried iBooks along, but it's a decent contender – and iFans may like having their book collection sat alongside their music and app collection (and cloud synced to boot). As a reader it is solid, if unexciting.

Marvin: A feature-rich and highly rated ereader app that is specific to iOS, Marvin is full of useful ideas that other apps don't offer, such as a reading timer (for study periods, or to remind you to go and let the cat in after reading for an hour), clever filtering options for your ebook library, and buckets of customisation options. The drawback to Marvin is that it doesn't support DRM from other stores, and the full version of the app will cost you (but not very much).

eBookMobi: Of the three iOS-only platforms we've looked at, eBookMobi supports far and away the best range of file formats. You can import your own .epub and .mobi files alongside a swathe of other formats, and can also import via iTunes and Dropbox. Unfortunately, it does lack DRM support, so DRM-protected books from other stores are still out.

66 Wattpad stands out on this list because it is fundamentally different to the apps and stores we've looked at thus far 66

frippery, perhaps, but one that goes so far as to allow readers to simulate playing with the corner of a page whilst they're still reading it. That's dedication to bibliophiles!

Colour schemes, text sizes, fonts, alignments and line spacing are available to customise, and the 'timeline' feature – allowing you to quickly navigate through the book – is probably the best available, with numerous intuitive features. Note-taking features are less obvious less and powerful than the Kobo's but, like the Kindle app, can be accessed via tap-and-hold.

On Android devices, the Play Books store integrates with the regular Play Store, and books can be purchased either from the Play Store or via a re-themed book-only storefront within the app itself. It's all as fluid and responsive as you'd expect from Google. They also claim to offer the largest selection in the world, at four million books.

Alas, for iOS users Play Books is a less tempting prospect. Although it is available – whereas there is no Apple iBooks for Android – the app's rating is average at best, and it's probable this version receives comparatively little attention from Google.

For the rest of us, perhaps the only real disadvantage of Play Books are the occasional gaps in its catalogue, its support being limited to .epub and .pdf, and the fact that using it locks us yet further into Google's product-and-services ecosystem (albeit this can also be seen as a plus).

Wattpad

Wattpad stands out on this list because it is fundamentally different to the apps and stores we've looked at thus far. There isn't really anything quite like it – at least not as popular. Its origins lie in a writing community founded back in 2006. Users could post their material – stories, poetry, articles etc. – and read and comment upon that posted by others. A

community grew around this, with about 50% of its audience base apparently from the US, but the other half hailing from the other three corners of the world.

On first launch the Wattpad app makes some effort to introduce its unique concepts to new users, explaining in simple terms that you can 'follow' authors and books to see when new content appears. This unique approach goes so far as allowing authors to release their books chapter-by-chapter, with readers following them almost as they are written. The setup process also includes optional social media integration – as with Kobo, using Wattpad can be about being part of a reading community.

As a reading app, Wattpad offers the standard customisation features alongside a communal commenting system. This is on by default, albeit hidden behind tap-and-hold functionality, and it may be considered a pro or a con to be able to see the comments of others on what you're reading, depending on your taste for such things.

Unfortunately, pages often load slowly, with pages apparently not pre-loading as far in advance as they do within other apps. Perhaps this is simply the inevitable result of the app pulling public comments from the web for each page that loads. Disabling inline comments does improve loading slightly, although it's still not as fluid as on other devices.

The other big potential issue with Wattpad is its catalogue – which of course is largely full of self-published material. Quality is highly variable, although there's little doubt numerous diamonds are to be found among the mountains of rougher submissions. Still, this is clearly an app and community for enthusiastic readers, and is obviously intended to be used alongside other apps that offer more traditional publisher-vetted catalogues.

Bluefire Reader

Seattle-based Bluefire Productions offers its reader app as a 'white label' platform to other businesses, allowing them to rebrand it and integrate their own stores with it. Of more interest to you and I is that it also offer Bluefire-branded Android and iOS versions for free.

The app is connected with two stores, although one of these – Books-A-Million, a large American chain – can't be browsed through the Bluefire app. Instead it directs users to download and install the store-specific app, which seems an unnecessary complication. The second store is Feedbooks, a France-based ebook retailer that offers 'millions' of ebooks (it, like Amazon, doesn't say how many millions), from new releases to free public domain works – a pretty decent selection all.

3

TING not to have brought back some important statement, fact. Women are poorer than this or that. Perhaps now it er to give up seeking for the receiving on one's head an opinion hot as lava, discoloured. It would be better to draw the ut out distractions; to light the w the enquiry and to ask the records not opinions but facts, under what conditions women rroughout the ages, but in the time of Elizabeth. a perennial puzzle why no a word of that extraordinary n every other man, it seemed, f song or sonnet. What were in which women lived? I

inative work
ble upon the
tion is like a
' so lightly
fe at all four
t is scarcely
plays, for
complete by
eb is pulled
, torn in the
ese webs are
real creatures,
uman beings,
aterial things,
ouses we live

elf where the
n one of the
History of
up Women,
to the pages
ead, 'was a
was practised
ell as low....
es on, 'the
marry the
ce was liable

▲ The 3D page-turn effect in Google's offering is pleasant, if a little frivolous

Epilogue

It's difficult to single out a single app as a clear 'winner' in an overview piece such as this, or even pick just a couple. The reality is that whilst some apps do offer superior reading experiences to others, the majority are all fairly similar once you get into the process of reading. Similarly, whilst some of the stores associated with apps offer larger catalogues than others, none of them offer everything, so if you're determined to find a particular book in digital format you're going to have to shop around anyway.

Realistically, an avid reader is likely to end up using a few different apps in order to cover the bases of all their reading needs. More than a few can become overwhelming, of course, so we hope this roundup has helped you narrow down the field – and make the choice that's right for you, your reading habits, and the devices you use.

The app also supports Adobe DRM, which means that any ebooks you've purchased elsewhere that are protected by this DRM solution can be imported into and read using the Bluefire reader. This includes many books available via Nook, Kobo and Play Books.

The app itself offers a reasonable reading experience, although oddly the book that comes bundled with it – *Treasure Island* – doesn't seem to be set up to match the app's own font resizing or pagination functionality. It's readable, but sometimes the text appears too small, or gaps in pages will appear. If you want to adjust font settings,

then this must be done on a different settings page – almost all other apps allow this to be done on-page so you can immediately see the effect your changes have had.

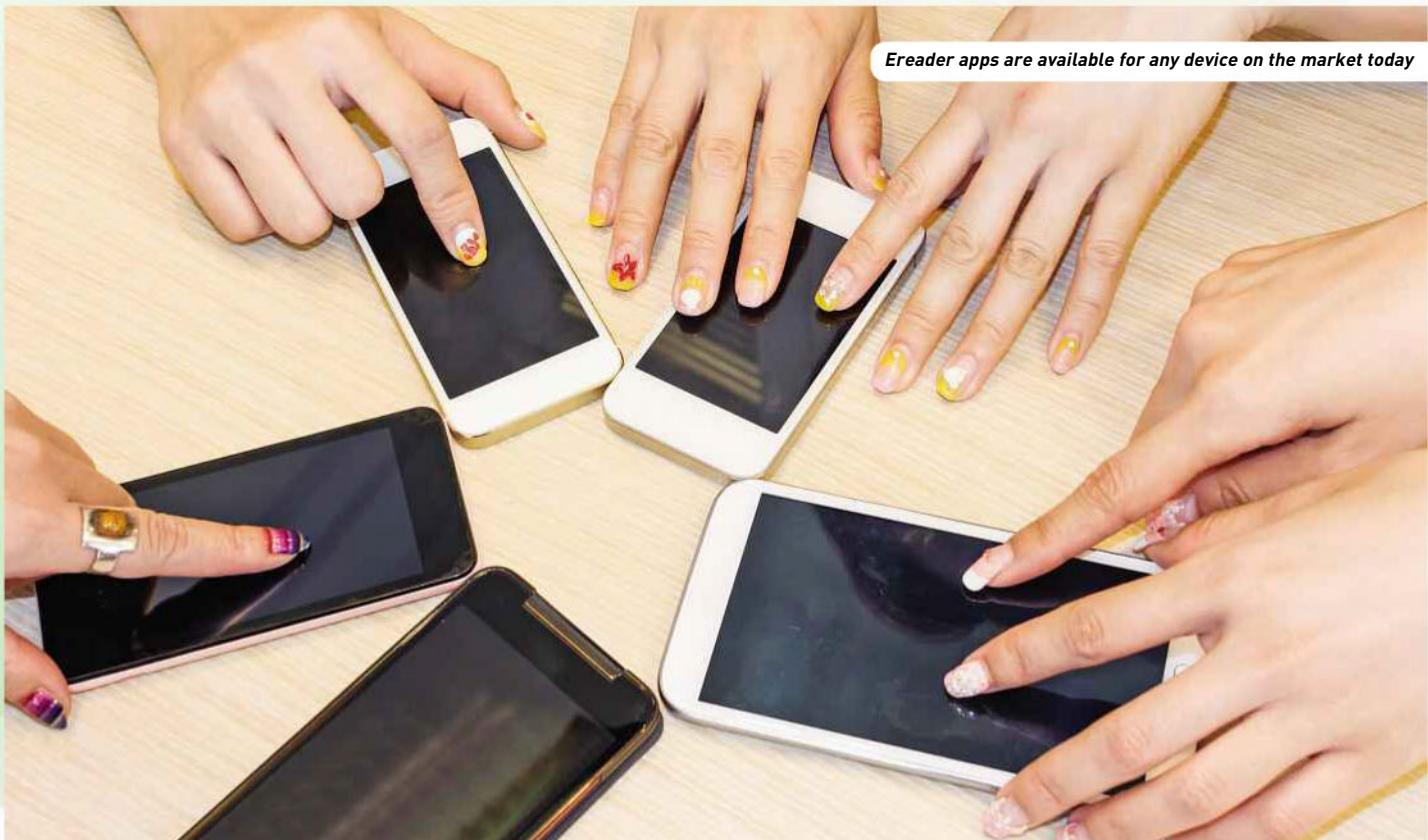
The Bluefire Reader is a decent app, and being able to import books purchased elsewhere is a great feature, but the flaws in the experience versus other apps make it difficult to recommend. Still, given the severe restrictions the more commercial apps place on importing books from elsewhere, it's worth installing Bluefire – or another app from our shorter roundup below – as a library for your sundry ebooks.

Subscription-Based Apps

A relatively new development in the world of ebooks is the idea of a subscription service – essentially a Netflix for books. There are two big players in this market at the moment: Scribd and Oyster.

Oyster is, at present, only available in the US, although when contacted for comment its response implied they intend to move into the UK market in the future. Scribd costs \$9 a month, offering a one month trial to get you started, and its catalogue includes both books and audiobooks. The front-end of the app is extremely slick and, although the reader portion is a little less polished, it still works well, offering good customisation options and progress-tracking features like the Kindle's. There are also extensive social components, and users can upload their own self-published work via the platform.

Scribd's library is much smaller than that of the other apps we've featured, at half a million ebooks and 30,000 audiobooks, but still offers a decent selection – and frankly, the service only launched last year. One to watch (and perhaps read or listen to). **mm**





Health And Fitness Apps For iOS

As the new year gets underway Keir Thomas looks at six ways to let your tablet or phone make you fitter

Gyms earn most of their money in January when all of us sign up with the best intentions of turning over a new leaf. That leaf drops off the tree quickly, of course, but why pay anything at all when you can get an app for free that can help you make modest changes to your lifestyle?

Below we look at six apps, and as usual all are available free of charge from the App Store, although most have in-app payments and upgrades. Our test platforms are our faithful iPhone 5 and Retina iPad, although for obvious reasons of portability, several of the apps only run on the iPhone.

FitStar Yoga

Internationally recognised Yoga guru Tara Stiles is behind this app that aims to not only introduce users to yoga and its attendant health and weight loss benefits, but also help further the skills of those who have existing ability. Setup involves choosing a skill level: Beginner,

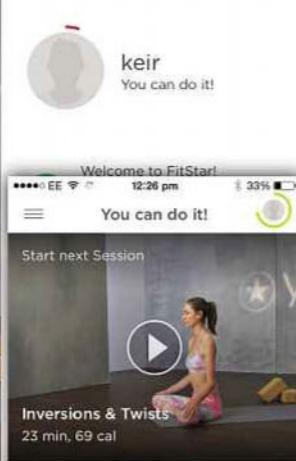
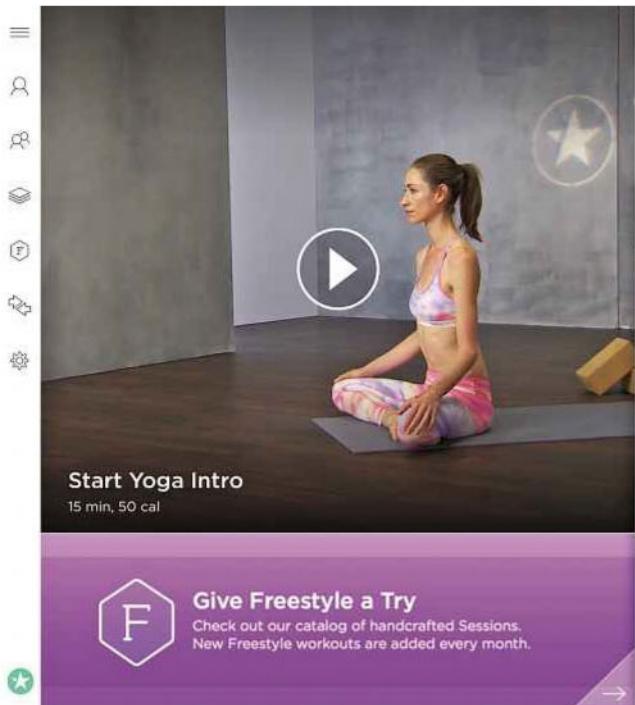
“Why pay anything at all when you can get an app for free that can help you make modest changes to your lifestyle?”

Intermediate, Advanced or Expert. You’re then invited to create a YogaStar account (you have no choice) and are told to respond positively to the request for the app to send you notifications. After all, health apps have to be able to nag you.

Music plays throughout this process, and Tara appears in frequent video inserts to explain what’s going on. The app then jumps straight into the intro tutorial video. A label on the video indicates how long the session will last and how many poses will be demonstrated. The video clips for these poses begin to load immediately, as shown on a countdown clock, and meanwhile four not entirely unfit young people are

shown in sequence sitting down on a mat and sitting cross-legged on the floor. This is accompanied by synth new-age music called Himalayan Disco, which can thankfully be silenced in the Settings panel, where you can alternatively choose your own soundtrack.

Once the poses have loaded, which tended to take rather a long couple of minutes in our test across a 13Mbit ADSL line, a Start Session button appears and finally Tara reappears to give instructions on how the app works. These also apply to all future ‘customised’ videos that are selected to meet your skill level. As Tara explains, the four good-looking people will run through yoga positions and you



▲ **FitStar Yoga** will show you how to get fit and lose weight by contorting your body

can tap a button on the screen if it's too hard. This way the app can gauge your level. You can also tap the screen to pause the video at which point a menu appears where you can also indicate that the current pose is Just Right or Too Hard. Unfortunately, this menu also applies a black overlay to the video, which makes it hard to take a look at a freeze frame of the pose. You can tap the back and forward buttons to jump back and forward in the sequence of moves, however, which is useful for repeating a pose you can't get right.

Tara appears at various stages in both vision and voiceover with advice about the poses ("Try and stop your knees and hips rising up", for example), but it's the models who rather hurriedly run through the contortions. Some slow-mo would be helpful, Tara.

Following this first video you get a medal (these are cleverly used throughout the app to motivate), and then comes the hard sell: Tara appears one final time to highly recommend the £5.49 per month or £27.99 per year Premium package. This unlocks the entire app in which you get the whole video catalogue of poses, with the ability to create custom sessions. Video is also enhanced to HD. For refusing to part with cash you get one customised 20-minute session per week, which appears as the primary option in the app interface, plus on-demand access to the Easy Flow 13-minute session that

contains the core moves most of us are likely to do regularly. You can earn a free week of Premium by getting mates to sign up.

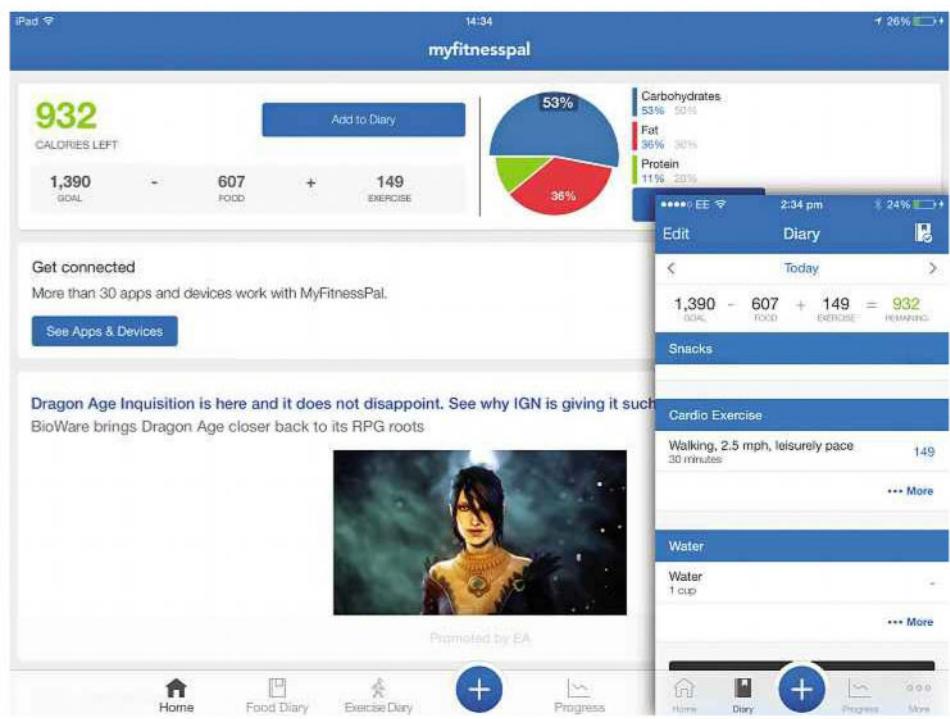
There's much to like about this well-executed app. The freebie option is genuinely useful, and as a way of avoiding dusty Yoga mats at your local church hall FitStar Yoga it's a superb option.

MyFitnessPal

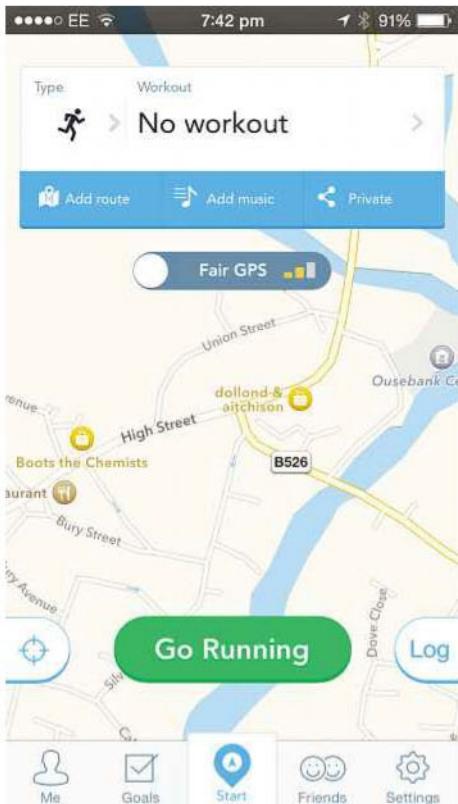
The goal of this app is to track what you eat and how you exercise, in order to help you lose weight and stay healthy. It does this by being a kind of Facebook for fitness: what you consume and do is added as status updates within the app's community, and you can also write your own status updates. The app invites you to tie into Facebook, but you can also add buddies via email address and the app can link into 30 third-party apps and devices in order to track fitness. Go running with the popular Map My Run app, for example, and it'll immediately share the data with MyFitnessPal. There's also a website interface, and data syncs in the cloud automatically and instantly.

The app starts by letting you create a profile. This quizzes you on your existing health levels and your plans – how much weight you want to lose and what kind of lifestyle you lead: Sedentary, Lightly Active, Active and Very Active (guess which one we Micro Mart desk jockeys fall under?). Rather interestingly, here you learn the app can also be used to maintain an existing weight or even to gain weight – useful for those battling eating disorders or recovering from illness.

After inputting other data such as your height and age and how much you want to lose each week, you're given a calorie goal. Mine was 1,390 per day. You're also told how much weight you're likely to



▲ **MyFitnessPal** tracks your intake and exercise so you can plot exactly how effective your new regime is



▲ *RunKeeper lets you not only track your exercise via GPS but also set training plans and goals to get fitter and lose weight*

lose within a month should you stick to your plan.

From then on it's a matter of inputting everything you eat and do, which can be done by tapping the plus button on the app's interface or responding to one of its notifications that appear just after mealtimes (breakfast, lunch and dinner). You can search for foods within a superbly extensive database that's UK-friendly or use your device's camera to scan in a products barcode. This didn't fail in our tests, even when faced with a somewhat obscure tin of Asda own-brand lentil soup.

Exercise also needs to be inputted – both cardio and strength building – and again you can search for your particular activity from an extensive list, making it easy to tell the app you spent your lunchtime walking briskly for 40 minutes, for example. It'll work out the calories spent and, cleverly, add them to your daily calorie limit. In other words, the link between exercise and eating is made crystal clear.

The app also lets you track water you drink, and you can input your weight too. Doing so adds to a progress graph where you can also track the size of your weight and hips and, for some reason, your neck

66 A clever little trick means that existing iPhones can already record a user's pulse rate 99

(ever heard anybody saying they need to lose a few pounds from their neck?!).

Other terrific touches include the automatic tracking of your intake of major vitamins and minerals via the aforementioned food database, as well as tracking of fats and carbs. Enter a particularly salty food and you'll be warned about it, while you'll also be praised for eating foods high in fibre.

All of this is free of charge, with no in-app upgrades, although adverts appear in the interface. This seems a reasonable price to pay for such a useful and intuitive app.

RunKeeper

An iPhone-only app – for what should be obvious reasons – RunKeeper is designed to track your running, cycling and walking. It does this using the GPS component of your iPhone.

Initial setup involves telling the app what kind of 'athlete' you are (runner, cyclist, etc.) and entering your weight and height. Annoyingly, this lets you enter only kilograms or pounds, without the ability to enter stones, so you'll need to swot up on your 14-times table.

Following this, you can start using the app immediately to track your exercise or get the app to remind you on a particular day and time. Once you start the exercise, the screen changes to show the distance you've travelled, your pace (minutes per mile) and time. Swiping left shows the miles you've achieved as individual split points, while swiping to the right shows a map with your location traced as a line. During a run you can snap photos, and there's also a handy display showing the strength of your GPS signal.

When you've finished, you're shown a summary of your run, with averages of the figures mentioned above calculated. You can also share your run data on Facebook or Twitter.

Further exercise sessions can be logged quickly by simply tapping the Go Running button on the interface. You can also create a route to follow (although only at the RunKeeper website, which is strange) and choose what music you want to play to motivate yourself. Curiously, there's no method in the app to choose a playlist, so

you'll need to have one cued up already in the Music app.

In addition to the GPS mode that tracks your running against a map, you can switch to Stopwatch Mode, which switches the display to a simple clock timer.

The strengths of RunKeeper lie in the ability to set goals and to hook up with friends in order to share your achievements or set competitive challenges. Friends can be added by letting RunKeeper raid your iCloud contacts book for email addresses and by letting it link into Facebook. Setting goals can involve adding a motivational picture (perhaps yourself during a fitter, leaner stage of life), setting desired bodyweight or distance goals or setting up a training plan that stretches across weeks and months. You can choose from various ready-made plans and schedules in order to prepare for a race, get fit or lose weight. There's also a selection of tutorials in the Learn To Run section, including the Beginning 5K plan that's worked wonders for lots of people. Many of the plans are available only as part of the Elite in-app upgrade, however, which will cost £6.99 as a monthly subscription or £27.99 per year. An Elite upgrade also brings with it the ability to broadcast your exercise live as you're doing it, as well as comparison tools that let you better track your progress via graphs.

Although RunKeeper claims to be for cyclists as well as walkers, there's little doubt its strengths lie in helping runners. This is no bad thing, and it's not entirely unlike having your own personal trainer. Unlike similar apps, the in-app upgrades aren't essential but may make sense later on during your fitness plan.

Instant Heart Rate

While Apple is going all-out for fitness this year with the pending release of the Apple Watch, a clever little trick means that existing iPhones can already record a user's pulse rate – with no additional hardware required. This is done by turning on the device's flash LED and asking the user to place their finger over both the flash and the camera lens. The app then detects slight colour changes in skin tone that indicate a pulse.

Obviously, you'll need to clean fingerprints off the lens afterwards but as a basic solution this approach works surprisingly well.

Instant Heart Rate is just one example of an app employing this method, and it returns a beats per minute (BPM) figure along with a graph showing your heart rate across the ten seconds taken to record it. This free version of the app records the previous five measurements and each can be tagged with what you were doing at the time – resting, for example or exercising. Hand-typed notes can be added too. By creating an online account you can sync your data online, allowing you to view it at the developer's website.

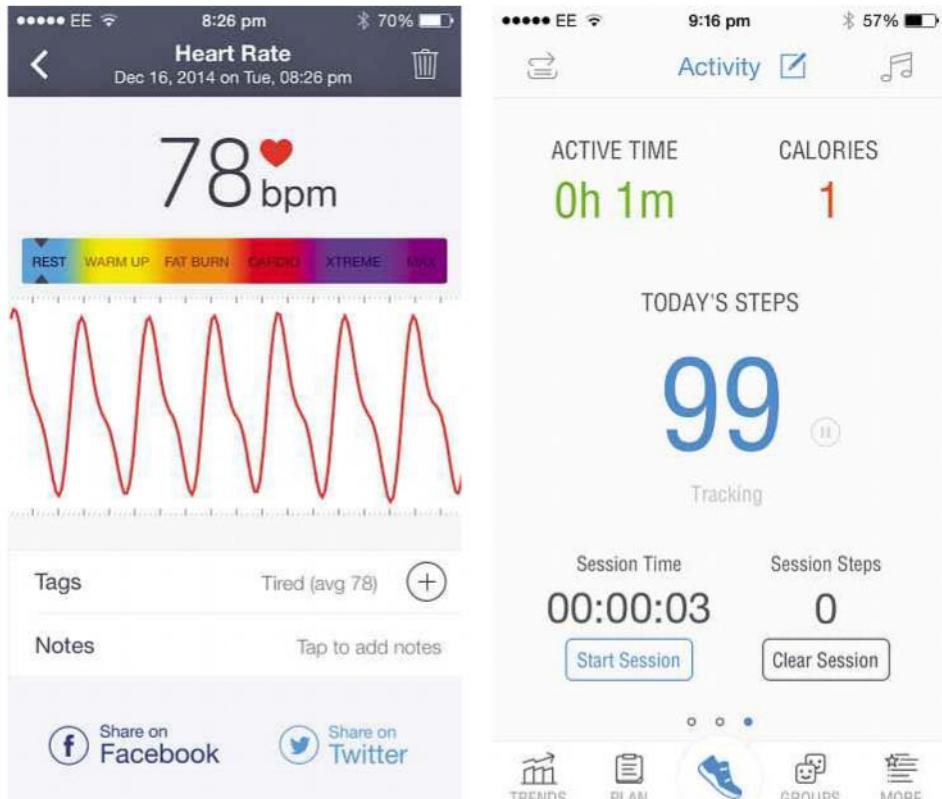
The settings panel lets you add resting and maximum heart rate zones, so you can see where your measured heart rate falls along a line ranging from rest through to Warm-up, Fat Burn, Cardio, Xtreme and all the way to Max.

Paying £2.99 as a monthly subscription or £20.99 per year lets you create 'hospital grade' reports on your heart activity and get access to fitness plans that come with their own videos. You might consider the asking price a little steep for such a simple app, but sadly that doesn't even unlock all the app's features – if you want the StandUp Test component, which aims to measure your fitness by your ability to stand from sitting (yes really), that's an additional one-off £2.49.

There's little doubt that Instant Heart Rate is a useful app but the hard sell for upgrades is a little too aggressive for our tastes and also a little unreasonable. One price should unlock everything.

Pacer

iPhones have featured motion sensors since the very first model in 2007, and it didn't take long for developers to realise this could be used as a pedometer, in order to measure footsteps taken by the person whose pocket the phone was in. Pacer is a particularly good example of an app designed with this in mind and opens to the step counting screen, which shows the total number of steps taken that day. Pacer works in the background and also



▲ Instant Heart Rate measures your heart rate without the need for any additional hardware

when the phone is in sleep mode, so once you've started it, all you really need to do is check in every now and again to see how you're doing. Because iOS has been known to kill apps it thinks aren't in use, Pacer will indicate that via a red dot inset against its icon if you need to start the app to wake it up.

Also on the step counting screen you can swipe left and right to activate different modes, including one to view the number of steps taken plotted across a graph showing the hours in the day and a mode that lets you start a timed session – ideal if you want to undertake a certain number of steps during 30 minutes of your lunch break, for example.

However, tracking the number of footsteps you take is only the start of Pacer's usefulness. Tap the Trends icon at the bottom of the screen and you can view the number of steps taken over the past week (once the data has built up,

of course). Here you can also input your weight and blood pressure figures in order to track those, providing a way to monitor your progress in getting fitter.

You can also follow a fitness plan, although one is provided without upgrading: Couch To 10K Steps. Put simply, this sets various step targets for each day and reminds you via notifications that you have a certain quota to fulfil before bedtime!

Rather strangely, upgrading to all the in-app purchases was free of charge during our testing, and the app description mentioned that this is a summertime offer despite the fact we're writing this during one of the coldest winter days of the year. Maybe somebody's forgotten to reinstate charges? Who knows?

The Groups feature lets you connect with friends using the app in order to share data. This can be done via private groups you create or are invited to join. Using the Groups feature also shows a live update of the average number of daily steps from users of the app worldwide (it's around 4,500, if you're wondering).

Pacer is a genuinely useful app even before the free upgrade is taken into account and is recommended for anybody who wants a gentle way to get fit. **mm**

66 Although RunKeeper claims to be for cyclists as well as walkers, there's little doubt its strengths lie in helping runners 99

Remembering...

Crash

David Hayward gets all misty eyed over his favourite childhood magazine

There was a time, back in the 80s, where the ZX Spectrum ruled the roost many a child's bedroom; a wonderful, rose tinted and nostalgic time of gaming and learning how to program in BASIC. One of the many elements that made it so wonderful were the magazines that we obsessively read from cover to cover. And the one magazine to rule them all was of course, *Crash*.

The editorial content was a heady mix of abstract humour, fictional story telling and tales from the Crash Towers, which were situated in deepest, darkest Ludlow. It worked a treat and – despite the odd rants and raves of the writers – you became so attached to these machinations that you'd swear blind you knew the staff like a group of friends.

Of the many regular features that kept the readers purchasing their copies every month, the most notable were the readers' letters page or Forum, edited by Lloyd Mangram – actually a pseudonym for various members of staff who contributed. The Tips Page, as written by Hannah Smith, the famous 'girly tipster' who was constantly at war with C&VG's female (imaginary) tipster, Melissa Ravenflame. The notable fiction column, which displayed a series of stories over several months' worth of magazines. The adventure column – hosted by Derek Brewster initially. The excellent covers, featuring Oliver Frey's amazing artwork, that sometimes caused controversy by depicting men and women in various stages of undress, in the process of disembowelling each other or both.

Who could forget the many reviews, some great, some good and some not so good? Those that shone out from the rest – in other words, any game that scored above 90% – received the coveted Crash Smash award.

It wasn't long before the games industry took heed to the writings of Crash and the influence it held over the buying public and bribes and other enticements were offered for a favourable score.

It's History

Launched on 13th January 1984 (originally in 1983 as mail order, but launched in '84 as a true magazine) by Franco Frey, Roger Kean and expertly illustrated by the legendary Oliver Frey, *Crash* went on to become the oracle of all things Spectrum. Although its main focus was gaming, this was interrupted by the occasional titbit of hardware coverage – especially if it encroached on the gaming possibilities of the Spectrum. There were also occasional features dedicated to covering Play By Mail, strategy games and educational titles. Predominantly, though, *Crash* was where you found out what was going on behind the scenes of the 80s gaming industry and where you could finally find out a little about those responsible for the games we loved so much.

By 1986 Newsfield were reportedly selling over 100,000 copies of the magazine. According to Roger Kean, the real strength of *Crash* was the help the magazine received from the local school kids, who turned out to be the reviewers of the games – after all they were the target market.

It was this attitude to the magazine, written by those who understood the new trend in home computing,

Did You Know?

- Subscribers to *Crash* received the newsletter *The Journal Of Mystical Affairs*
- Oliver Frey is still producing marvellous artwork...
- ...and Roger Kean is still penning marvellous words
- The monthly comic strip, *The Terminal Man*, is available in paperback from Amazon (goo.gl/P8EfXJ).
- *Micro Mart* shared shelf space with *Crash* back in the day – we turn 30 this year!

that made *Crash* stand out from the other magazines available at the time. Unfortunately, the love affair that was *Crash* came to an end on April 1992 with issue number 98, when *Crash* was eventually merged with Sinclair User for a couple of months before disappearing altogether. Such is the lot of a magazine so synonymous with a single computing platform.

The Good

Incredible artwork from Oliver Frey, honest and clever writing from Roger Kean and the other editors. Wonderful game reviews and the sense of humour and community.

The Bad

Nothing, from our point of view. Though we could be seen as being a little bit biased by nostalgia...



► *The Chairman*, from the cover from *Crash* issue 1

▼ An iconic logo this



The Things That Frustrate Us About... WordPress

It's an easy way to make a website and get your writing out there – but it's annoying too

Once upon a time, you had to mess around with HTML and CSS or buy specialist software to build your own website. Now, though, there are plenty of full-featured, easy-to-use online solutions that can get a professional looking site online for you in minutes. WordPress is one of the best: if you're just looking to start a blog, you can get one hosted for free via wordpress.com, or if you need something better and are willing to pay a bit of money for hosting, you can install WordPress as a content management system on your own server. It's powerful and reasonably simple to use, and millions of people have caught on to it. So let's have a whinge about some of the more annoying quirks of the system...

Argh! Weird Formatting Issues

Creating pages and posts in WordPress is generally pretty straightforward. You can either use a WYSIWYG editor or a HTML one, depending on your needs and skills. Yet sometimes, between hitting publish and the content appearing, something weird happens to it. Line breaks appear or disappear, or junk code appears in the middle of your text. Suddenly instead of making everything easier, WordPress is making life harder, because you need to edit and re-edit your work to get rid of the errors. Argh.

Fix it: How you can fix these bugs depends on what's causing them. If you've pasted text from another program, that might be where the problem is, and you'll need to clean up your formatting. Or it might be that a plug-in you've installed is doing something weird, and you'll need to find it and disable it. Sometimes it's just one of WordPress's own quirks, and it can be solved by just re-editing the post.

Grr! Spam Spam Spam

Spam isn't an issue unique to WordPress, but for some reason WordPress blogs are particularly prone to spam comments. Every day, more and more comments shilling fake Rolex watches and knockoff prescription medicines appear. There's a saying that tells us we're 'never more than six feet away from a rat', but on the internet, it seems like we're never more than a click away from a spam comment.

Fix it: WordPress is reasonably good at filtering out spam: the Akismet spam filter is included by default in new WordPress sites, and it should keep most spam comments from appearing on your site. Some may still leak through, though, and it might be worth moderating your comments to stop them appearing live.

Doh! Design Dramas

WordPress allows for tons of customisation: you can choose from pre-designed themes, then edit images, fonts and colours, add headers and footers, and add all sorts of other apps and plug-ins to alter the functionality and layout of your site.

You do need to be careful how you do it, however, because an update to a theme can undo a lot of your hard work if you've changed design elements in the Editor tool. If you decide to change themes too, you might suddenly find that some of your plug-ins don't work with the new theme or that you'll have to completely overhaul your site.

Fix it: The thing about WordPress is that it's an open source project, with thousands of volunteers working together to help to develop and debug it. That's a pretty awesome thing, when you sit back and think about it, but it does also mean that sometimes, not everything works the way you want it to – and fixes can be slow. Your best bet, if you're struggling with something, is to head to the community forums and find someone to help... even if it's just that you've messed up the look of your site and need some help returning it to its former glory. **mm**

The screenshot shows the WordPress visual editor interface. At the top, there are 'Visual' and 'Text' tabs. Below the tabs, the editor contains a block of text with several line breaks. A large image of a book cover titled 'Den Of Geek presents Den Of Eek! A Collection Of New Horror Edition' is inserted into the post. The image has a blue and yellow abstract design. At the bottom of the editor, there is a list of book titles and their authors.

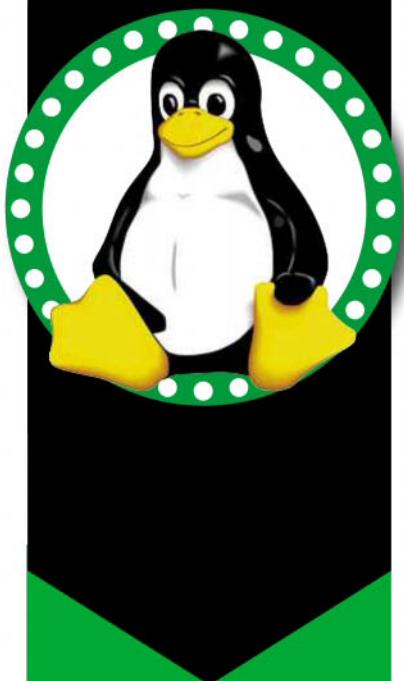
Hey, remember when I put together an event where loads of amazing people came and read ghost stories in a London pub? [Sure you do](#). It was brilliant.

Well, finally we got round to publishing an ebook collection of all the stories read that night. The twelve short stories in this book are completely original, created especially for the event, so you can't get 'em anywhere else. The full contents list looks like this:

- "Grind" by Clayton Littlewood (author of *Dirty White Boy* and *Goodbye to Soho*)
- "The Double Walkers" by Leila Johnston (editor of The Literary Platform and author of *Enemy of Chaos*)
- "Siren" by CJ Lines (author of *Filth Kiss* and *Cold Mirrors*)
- "Matron" by Sarah Pinborough (author of *Poison*, *Mayhem*, and *The Language of Dying*)
- "Death in the Modern World" by Natasha Duncan-Drake (chosen as part of the Den of Geek new talent showcase)

The screenshot shows the Akismet plugin dashboard. At the top, it says 'Say goodbye to comment spam' and 'Akismet takes the pain out of comment moderation.' Below this, there is a section for 'Get an Akismet API Key'. The main area displays various statistics: 'Treated by millions of WordPress sites, big and small.', '99.9% of spam is stopped before it reaches your inbox.', 'Blocks over 100 million pieces of spam every day.', 'Filters over 100 million comments every day.', and 'Identifies over 99.9% of spam with 99.9% accuracy.' At the bottom, there are sections for 'How Akismet works', 'How to use Akismet', and 'How to use Akismet with your theme'.

Specialists



David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

Linux

A New Distro For 2015?

Fancy a change of distro, check these out

One of the virtues of Linux is the fact that once you're bored with the look and feel of a desktop, you can install another and have a completely different aspect to gaze upon. What if you've had enough of the core distro itself, though?

It's no secret that many of us are distro junkies. We often hop from one to the next, testing, toying and see what they can do before moving on to the next. These days we can do it from the comfort of a virtual machine, without the need to get our hands dirty or damaging or deleting any personal data.

With this being the beginning of a fresh new year, why not chuck out the old then and give these fine distros a test. Some of these we haven't used in ages, some we never got around to testing last year. Others we've never even heard of.

Sabayon Linux

Sabayon 14.12 is the newest version of this Gentoo-based distro that has quite the following. It has been knocking around since 2005 and now comes with a choice of Gnome,

KDE or Xfce desktops and an out of the box experience to help you get up and running relatively quickly.

SymphonyOS

SymphonyOS is a Debian flavoured distro with a custom Perl and Gtk2 Webkit built desktop called Mezzo. It's about seven years old, as a distro, but has in that time only ever released a couple of versions. It's reasonably quick and can be quite fetching once you get the measure of it.

PinguyOS

Pinguy is another Debian-based distro that was once the flavour of month with many a Linux user. There hasn't been much from the Pinguy camp of late. The last release, 14.10, didn't happen due to a lack of changes and having such a short lifespan. Version 14.04.2 is scheduled to be released on February 6th though, so keep an eye out.

ArchBang Linux

This rolling release distro is based on Arch, but features a slimline Openbox Windows Manager. There hasn't been much heard

from the ArchBang team for quite some time now, which is a little worrying if you've settled on it as your Linux of choice. Still, the distro is available and being a rolling release means it's kept up to date and is quite capable.

DragonFly BSD

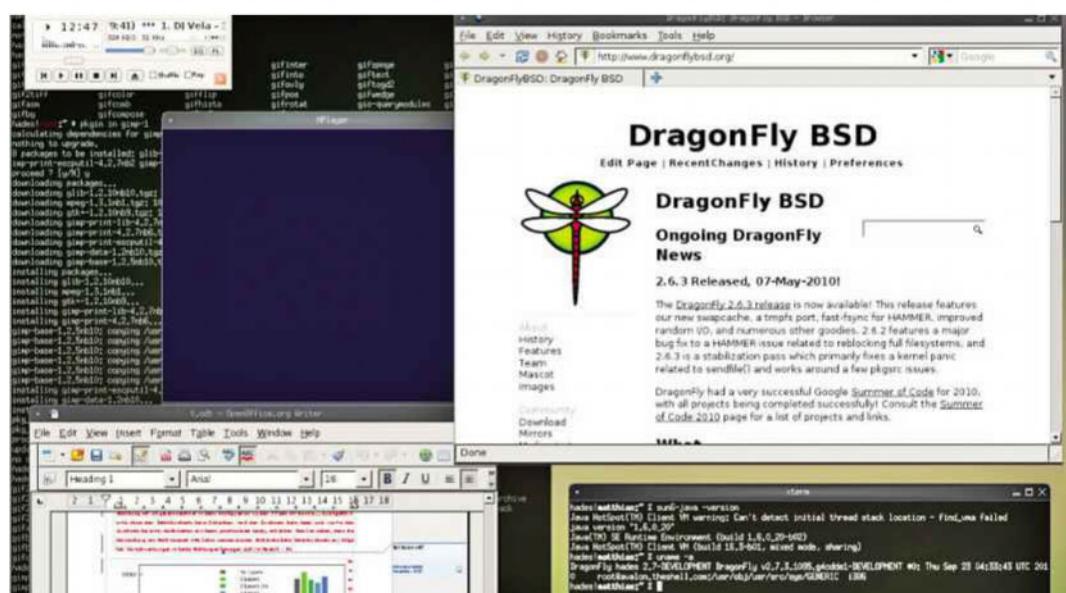
DragonFly BSD is a Linux distro based on the ideals and APIs of UNIX, and as such isn't always the friendliest distro to play around with if you're not completely confident in what you are doing. Saying that though, it's very fast and quite powerful once you begin to peel back the layers – and the FVWM desktop is a pleasant change as well.

So if you're looking for more of a challenge this year, then DragonFly may well be the distro for you.

Keep on Linux-ing

Needless to say there are far more distro's available than we have time to include here, but that's part of the fun of Linux. It's all about experimentation and seeing where it takes you next.

▼ *DragonFly BSD, it's something different and worth a look*



Lockdown

In 2015, Craig Grannell wants Apple to deliver on its promise, and be a little more open

Apple has a reputation for creating closed boxes, especially where software is concerned. On mobile, the iPhone was initially not extensible at all, unless you think web apps are the future. In the end, the App Store changed that, but users were limited to installing only apps and games Apple deemed acceptable on its devices. Jailbreaking was – and is – the only means of installing from absolutely anywhere, causing much mirth among the Android faithful.

On the desktop, Apple resisted the temptation for anything similar for a long time, but recent versions of OS X include clear changes in thinking. The Mac App Store arrived; again, it contains only apps and games Apple has reviewed and approved, and there are limitations regarding what developers can achieve with apps made available in the store. Additionally, OS X's security settings were amended by default, only allowing apps to run that are downloaded from the Mac App Store and 'identified developers'. This can be changed in the Security & Privacy section of

System Preferences, but plenty of people never venture there. Slightly more chillingly, there's a Mac App Store option (as in, Mac App Store-only) along with the rather saner 'Anywhere'.

Given Apple's obsession with control, it was therefore perhaps surprising to see iOS open up at WWDC 2014. Apple gleefully unveiled extensions, bringing iOS more into line with the likes of Android. You could add third-party keyboards, widgets displaying time-sensitive information, and sharing/action extensions; Photos also gained new powers, through apps essentially being able to 'inject' their capabilities into Apple's stock app.

Apple allowing iOS to be a touch more open wasn't matched by changes to the company's tendency to dictate to developers what they would or would not be allowed to do. This means a continuation of the Russian roulette we've often seen – with apps approved, often making innovative use of Apple's new toys, only to later be threatened with expulsion from the App Store for breaching an unwritten rule that no-one knew existed (probably because it

didn't until Apple at that point thought of it).

The problem is that Apple has two extremely capable operating systems, but a tendency to alienate devs, and the result can only be stagnation. If Apple provides a slew of new tools at WWDC 2015 for iOS, why would devs want to try doing something different with them after seeing the various high-profile companies and products that were hit by Apple's random hammer in 2014?

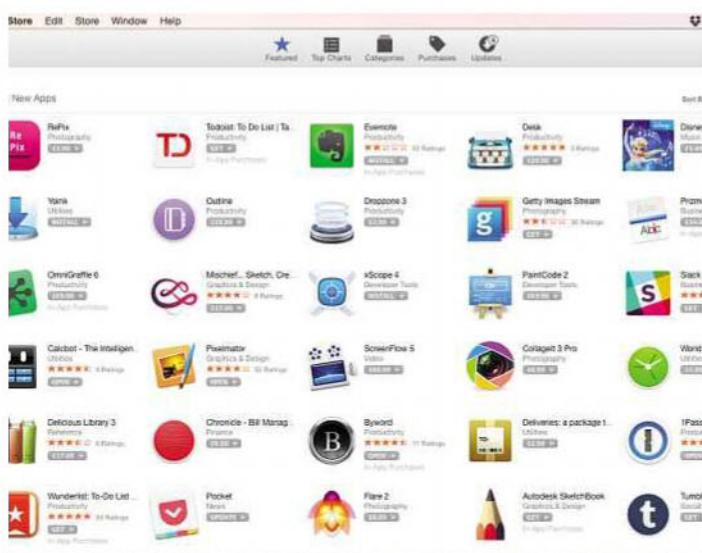
On the desktop, things aren't terribly rosy either. Every month or so, another high-profile app announces that it's going to direct-sales only, rather than sticking around in the Mac App Store. Some giants – Adobe; Microsoft – never bothered with Apple's store anyway, but once the best of the indies flee too, all that will be left is a slew of badly ported iOS games, a ton of pointless utilities, and a bunch of third-rate garbage.

I'm hoping Apple's resolution for 2015 is to be more open across the board. On releasing new technology and APIs, it must tell developers what will and won't be allowed; on occasions where something occurs that Apple hadn't anticipated, there needs to be a conversation, not a blanket ruling. In a more general sense, Apple needs to find a better balance between security and openness. People need to be able to do what they want with their machines, whether they're desktops, notebooks or mobile devices. You might scoff at the thought – this is Apple, after all – but no-one ever thought we'd see SwiftKey on an iPhone, and that alone is proof Apple can change.

◀ If Apple keeps annoying devs, it won't be long before the MAS 'new app' selection is bereft of quality



Craig Grannell is a writer, designer, occasional musician and permanent loudmouth. He's owned Macs since 1996, when Apple was facing certain doom, and is therefore pleasantly surprised by its current success. Find Craig on Twitter at @craiggrannell



Mac



Ian is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Mobile

Best Tablet Accessories 2014

Go big or go home - Ian McGurren looks at accessories for your new slab

Last week I looked at some of the nice bits and bobs you can feel justified in purchasing for your new phone, but what if you were extra 'nice' this year, maybe rescued a whale or something, and were rewarded with a shiny new tablet? What could you possibly get for that? Well, let's have a look.

Gaming on tablets is coming along. Yes, I probably said that in 2013, 2012 and maybe even 2011 but in 2014 the standard is not just reaching that of the initial round of PS3 and Xbox 360 titles, it's growing at an exponential rate. For those of us who find playing 'traditional' games on a touchscreen as much fun as DIY dental surgery, it's a blessing that quite a few games are now beginning to accept a controller input. The best platform for controller use is still Android, and is very simple if you want to wire up a joypad from an Xbox 360, Xbox One, PS3 or PS4 over USB. Wireless is a little more complex, though controllers such as those from Moga work fine over Bluetooth. The ace in the pack here is emulation, with tactile input really the only way to go.

If you're one of those who takes your tablet into all manner of places in the home, you'll know that somewhere like the shed or the kitchen isn't the most electronics friendly place. So here's something useful, the Koala tablet wall dock. Essentially it's two small brackets that you drill or adhere to a wall/door/tent, in which your tablet of choice slots into, keeping it out of harms way. The concept is simple but it's one of those accessories that just makes things much easier and safer.

Alternatively, if you find yourself in the sky a great deal, there's Griffin's Skyview, a large mount for both phones and smaller tablets (up to iPad mini) that bolts into the tray latch on the rear of airliner seating. Then you just hang your device, plug in some headphones and be grateful you don't have to watch the in-flight entertainment – it could be *Annie*...

If you've got a nice, premium device, then there's every chance you'll be wanting a nice, premium case in which to keep it safe, and they don't come much more nice or premium than those from US company Grovemade. Unusually, for tablet cases, its products' unique selling point isn't premium leather but handcrafted woods, such as maple and walnut. Its slipcases also fit together in a gorgeous geographic patterned designs, making them feel a little like that lost 80s toy, Rubik's Magic.

Grovemade also do other accessories, such as a beautiful monitor stand, iPhone cases and even a matching plant pot – ideal for growing businesses (sorry, that's terrible, I blame the cracker jokes). Grovemade products aren't cheap, or freely available over here, but can be ordered from their website.

Finally, a speaker that I didn't expect to like: I'm no fan of Bose, its hi-fi equipment has always felt like style-over substance at best, and there has always been a much better product available, often for less money. However I will always give credit when it's due – and for the Bose Soundlink Mini bluetooth speaker, it is most definitely due. Having seen it on demonstration, and given its diminutive size, I wasn't expecting the device I saw to be making the sound I heard, especially outside, without the benefit of hidden speakers or even wall reflections or bass traps. The sound is

genuinely larger than life, and – importantly for a small speaker, and unusually for a Bose – the bass is controlled, punchy and isn't boxy in the least. While it won't beat hi-fi separates, that's not the point here, it'll certainly give many micro systems a run for their money, while still being battery powered and pocketable. What's even more un-Bose-like is the price of around £129. That's not bargain bin money, we'll admit, but for a quality portable bluetooth speaker from a name brand, it's a pretty fair price.

That's it for things to buy, so next time I'll be looking back at 2014's highs, lows and the rest. Happy 2015!



8-bit Masterpieces

How retro gaming images have become an art form

We have some sad news to report: this is to be the last ever regular Retro column. Our usual correspondent, Shaun Bebbington, is unable to commit to a weekly column any more, owing to commitments in his day job. In fact, he's so snowed under, he asked if I could write this final instalment for him. Before I do that, though, I'd just like to thank him for his tireless efforts over the years – and for sharing with us his passion for all things retro. Shaun, you'll be missed by all at *Micro Mart*.

Art Attack

Now, on to the column itself. To be honest, I'm not really much of a retro gaming fan. That's not to say there aren't any old games that I like, because there are (*Theme Hospital*, *Speedball II* and *Final Fantasy VII*, to name a few), but I'm too keen on modern bells and whistles (in terms of gameplay) to enjoy Commodore 64 or Spectrum titles on a regular basis.

One thing I do appreciate from the 8-bit age, however, is the artwork. Of course, the blocky sprites and backgrounds of these game was a result of technical limitations, rather than being a chosen aesthetic, but now they're viewed retrospectively as a *bona fide* form of art. People wear T-shirts rendered in 8-bit graphics. The internet is awash with websites of artists showcasing their retro-style creations – and as well as brand new games being created for old machines, a lot of developers are choosing to make games for modern PCs that look like they were made 30 years ago.

It makes me wonder whether in another ten years, we'll all be going crazy over graphics from the 90s and making games that have weird ragdoll people in them like the ones in *Goldeneye* (1997) on the N64. Well, you never know with nostalgia.

What I do know, though, is that right now the 8-bit look is big deal, so if you'd like to have a crack at producing your own retro masterpiece, then maybe

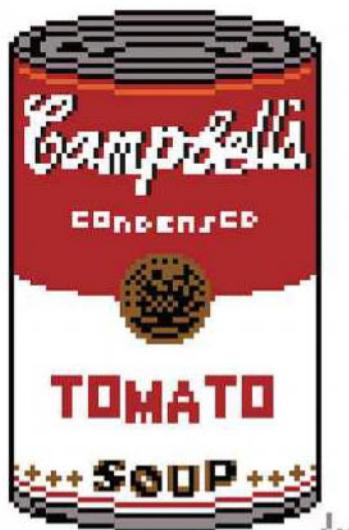


take a look at [make8bitart.com](#), a simple online paint program. Or if your artistic skills are limited, you can transform an existing non-8-bit image into something retro, and this tutorial should help: tinyurl.com/retro1341a.

For now, though, let the web provide some inspiration, with this fine selection of artworks from [8bitdecals.com](#) (which doesn't seem to credit the original artists, unfortunately). Which should serve as a good indication of what is possible in the world of sprites.

Shaun Bebbington has a passionate interest in 8-bit computing and gaming and has been finding novel ways to use retro technology since 1994. He's been our Retro columnist for a good while too, but – like all good things must, at some point – that is coming to an end this week.

Goodbye Shaun!



Retro

Specialists



Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

Gaming



This week, Ryan looks ahead to some of the most promising indie games on the horizon in 2015, from action adventures to space exploration sims...

Plug & Play

For the most part, major publishers have any given year pretty well sewn up. We all know there'll be another *Call Of Duty* title coming up in the autumn, and Ubisoft will put out another *Assassin's Creed* sequel. What about the smaller games from independent studios, though – the ones that don't have big marketing budgets and a familiar brand name to fall back on?

Firewatch is one such title, and it's the kind of unusual (but potentially fascinating) concept that wouldn't last more than a couple of minutes in a major studio pitch meeting. It casts the player as an ordinary chap named Henry, whose job is to monitor the lonely wilderness of Wyoming and keep an eye out for fires – and after a particularly long, hot summer, the threat of a deadly flash fire is a very real one.

Alone in a vast, largely unpopulated part of America, your only human connection is Delilah, the supervisor who talks to you over a handheld radio. As Henry spots something strange from his watchtower, Delilah acts as a lone voice of reason. "Henry, there are some things you can't prevent. Stay in your tower, okay?" Needless to say, the curiosity gets the better of Henry, and he goes off to investigate.

Firewatch is a work in progress from San Francisco-based developer Campo Santo. It is, in essence, a first-person adventure game full of exploration and climbing – though what intrigues us about the game is its sense of drama and mystery. Henry and Delilah clearly have a strained history, which is sure to come to the fore as the game unfolds, and who's the shadowy figure we see in the distance in the game's trailer (youtu.be/d02lhvvVSy8)? Camp Santo's game description simply says that we'll be "facing questions and making interpersonal choices that can build or destroy the only meaningful relationship [we] have".

The game's set in 1989, a year infamous in Wyoming history for its destructive fires. How they'll feature in *Firewatch*'s enigmatic story, we'll have to wait and see. With beautiful-looking environments and a great pedigree behind it (*The Cave*, *The Walking Dead* and *Bioshock II* are a couple of games Campo Santo's staff once worked on), *Firewatch* promises to be an absorbing, slow-burning interactive drama. You can find out more about this intriguing prospect by visiting www.firewatchgame.com.

Online

Last week, we shared a brief look ahead to *Evolve*, the forthcoming humans-versus-giant monster shooter from Turtle Rock. While it's undoubtedly one of the most promising online games on the horizon, it's by no means the only title to experiment with the increasingly trendy asymmetrical multiplayer concept. Although hailing from a new developer without the benefit of Turtle Rock's proven track record, *The Flock* could prove to be just as engrossing as *Evolve*.

The Flock progresses like a particularly dark and deadly version of the childhood game of Statues. At the outset, groups of up to five players take on the role of the Flock – a race of creatures blessed with extraordinary speed and agility. Their sole aim is to get hold of an object called the Light Artefact – essentially a large, futuristic torch. The player holding the Light Artefact becomes slower and more vulnerable, but the light itself is an extremely useful weapon – train it on a member of the Flock, and they'll be damaged. There is, however, a twist: the Flock's defence against the Light Artefact is to simply stop moving. If they remain still, they're invulnerable to the object's power.



▲ Five players can fight for control of the Light Artefact in the online action game, *The Flock*. It's like the childhood game Statues with a horror twist

It's a great idea, dressed up in a gothic and extremely murky sci-fi horror theme; standing in the dark, scanning the corners for enemies with the Light Artefact looks unusually tense. Being an indie game, *The Flock* doesn't look as polished as something like *Evolve*, but its style is distinctive and its concept could provide hours of competitive fun.

Another, very different online game we're looking forward to in 2015: the highly ambitious *No Man's Sky*. A space exploration sim on a vast scale, it's hard to believe it's the product of the small British studio, Hello Games, the creators of *Joe Danger*. The game first caught our imagination at E3, where its demonstration of a galaxy full of planets, all waiting to be explored, became one of the most talked-about projects of the entire expo.

Taking its cue from the trailblazing *Elite*, *No Man's Sky* is an open-ended game where you can pursue your own goals. Want to be a space pirate? Then buy a combat-ready ship and go hunting for enemy vessels. Want to be an explorer? Then you can make money by finding minerals on alien planets.

Recently released footage shows just how stunningly detailed *No Man's Sky's* procedurally generated galaxy is. Every star you see in the game

is orbited by planets. Visit any one of them, and you'll find a completely unique world: some are covered in oceans where strange creatures swim through the depths. Others are ice planets or deserts populated by giant lizards.

Admittedly, the in-game footage hints at the odd jerky frame rate and texture pop-in here and there, but these are surely a small price to pay for what *No Man's Sky* achieves elsewhere: the impression of a living, breathing universe full of possibility. There's much we've yet to see – space combat, for example, and how the mechanics of mining and selling work. If Hello Games can get those right, then *No Man's Sky* could be one of the most exciting games we'll see this year.

Incoming

Back in 2012, Mike Bithell captured our imaginations with the wonderful *Thomas Was Alone*, a puzzle game that somehow managed to tell a rich and poignant story with little more than a handful of coloured shapes and the voice of Danny Wallace. This year, Bithell returns with a very different sort of experience: *Volume*, a stealth game inspired by the Robin Hood legend and *Metal Gear Solid*. Taking place inside a top-down virtual world where its central



▲ *No Man's Sky* is fast becoming one of the most exciting-looking games of 2015, with an entire universe of alien worlds to mine and explore

character attempts to pull off a string of heists, the key to the game is distraction. The guards dotted around each area will kill on sight, and the unarmed player must find use a range of items to outfox them.

Although a bigger-budget production than *Thomas Was Alone*, *Volume*'s budget is still tiny compared to most modern

games. Nevertheless, Bithell's managed to acquire the talents of man-of-the-moment Andy Serkis to provide the voice of the villain, Guy Gisborne – and visually, *Volume*'s virtual realms of geometric shapes and gaudy colours really stand out.

Although a firm release date has yet to be announced, *Volume* is pencilled in for a 2015 release.

▼ The creator of *Thomas Was Alone* returns with the stylish stealth game, *Volume*. Here, cunning and subterfuge are required to pull off each heist



AD INDEX

2-3- CCL

21- One & One Internet

6-7- Morgan

99- Sapphire

11- DesignMi

100- BOX

15- Fuze

To advertise to contact Finan Tesfay

t: +44 (0)20 7907 6898

e: finan_tesfay@dennis.co.uk

NOTE TO ADVERTISERS

Micro Mart © Dennis Publishing, 30 Cleveland Street, London W1T 4JD. Company registered in England No 1138891. This publication may not be reproduced or transmitted in any form in whole or in part without the written consent of the publisher. Quotations for re-prints or other use of material are available on application.

THE BUSINESS ADVERTISEMENT DISCLOSURE ORDER 1977 (effective from 1st January 1978) requires all advertisements by people who seek to sell goods in the course of a business to make that fact clear. It is the responsibility of the advertiser to comply with the order. Lineage trade ads in Micro Mart carry this *T symbol. It is an offence for which you may be prosecuted not to advertise the fact that you are a trader.

MICRO MART is published weekly by Dennis Publishing. Subscriptions rates available on request. Micro Mart welcomes the submission of articles and reviews for publication. Please enclose a stamped self addressed envelope; otherwise the return of material cannot be guaranteed. Contributions accepted for publication by Dennis Publishing will be on an all-rights basis. Views or opinions expressed by freelance contributors are not necessarily those of Dennis Publishing. Advertisements and goods/services offered are the sole responsibility of the particular advertiser and Dennis Publishing cannot be held in any way responsible. Whilst every care is taken the publishers cannot be held legally responsible for any errors in articles or advertisements or any resulting unsatisfactory transactions. We will however investigate incidents on a written complaint. © Dennis Publishing 2006. This publication may not be reproduced in or transmitted in any form in whole or in part without the written consent of the publishers. ISSN 956-3881. Blimey.

'THE BEST BOOK EVER WRITTEN
ON HOW TO GET RICH'

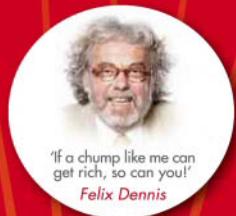
J. Disorabo, Amazon.com

This is a book about getting rich.

It's different from any other book
on the subject because Felix Dennis
made himself rich.

Very rich indeed.

And now he's going
to show you how
to do it!



THE CRITICS

'If this book doesn't
get you rich, nothing
ever will'

Mail on Sunday

'Well-founded advice
based on hard-won
experience'

Financial Times

'Full of honest insights.
I strongly recommend
this book'

Sunday Telegraph

THE READERS

'An inspirational book'

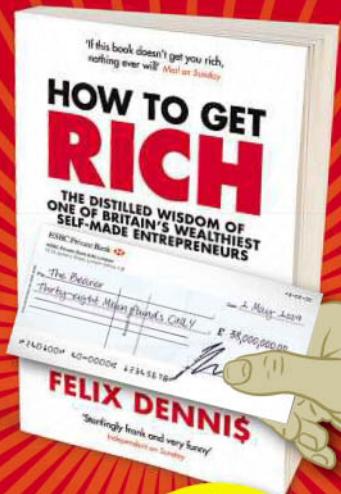
Alan Bates, Amazon.co.uk

'Essential reading.
A great work'

Tom Rubython, Amazon.co.uk

'A true masterpiece'

'The Wanderer', Amazon.com



AVAILABLE NOW AT BORDERS
AND ALL GOOD BOOKSTORES



www.randomhouse.co.uk/howtogetrich
www.felixdennis.com

'WISE, FEARLESSLY FRANK
AND TRULY INSPIRATIONAL'

Mail on Sunday



**TO ADVERTISE CALL
KARL TAYLOR**

020 7907 6706

karl_taylor@dennis.co.uk

FILCO

The best keyboards in the world.
Available from
www.keyboardco.com
0845 205 5555

**Today's news
today, not a
week later**

- Breaking IT news
- News that matters to UK IT decision makers
- Updated throughout the day

ITPRO
FIT FOR BUSINESS



IT news as it happens, online now at
www.itpro.co.uk

www.bit-tech.net

THE LEADING DESTINATION FOR PC ENTHUSIASTS & HARDCORE GAMERS

bit-tech.net

The Perfect Christmas Gift FROM JUST £17.50

Give your loved ones a technology magazine gift subscription to any of our computing or photography titles, from just £17.50. Choose from a great selection and give the gift that keeps on giving month after month!

Computer active
30 DAYS LEFT TO BUY A PC!
BLOCK & ERASE ADWARE
Eliminate unwanted toolbars, hijackers, PUPs, pop-ups and more - FOR GOOD page 90
FORTNIGHTLY
SAVE 32%
6 months: £17.50 or
12 months: £35.00

FREE SOFTWARE
COMPUTER SHOPPER
LAPTOPS
Low Price, High Performance
FROM £200
SAVE 27%
6 months: £21.99 or
12 months: £44.99

CUSTOM PC
Intel's 8-core CPU
From Intel's Octocore chip to the latest graphics cards, RAM and drives
SAVE 37%
6 months: £22.49 or
12 months: £44.99

Digital SLR Photography
Landscape Masterclass
Advanced techniques that add the wow factor to your images
SAVE 28%
6 months: £21.49 or
12 months: £43.00

micro mart
WEEKLY
DID THE SWITCH-OFF ACTUALLY WORK?
Or is it still the OS that won't die?
SAVE 24%
6 months: £39.50 or
12 months: £77.50

MacUser
Big
iPhone 6, iPhone 6 Plus, iOS 8.
SAVE 19%
6 months: £29.00 or
12 months: £63.00

PC PRO
HOW ALGORITHMS CONTROL YOUR LIFE
Why you only hear from certain friends and see the results Google wants
SAVE 31%
6 months: £24.99 or
12 months: £49.99

WebUser
DOWNLOAD TV TO WATCH ANYWHERE
Watch your favourite shows when you want
FORTNIGHTLY
SAVE 23%
6 months: £19.99 or
12 months: £42.99

To order online
visit magazinedeals.co.uk/xmasT2
or call **0844 844 0053** using offer code P1501PXT

To place an ad in our classifieds, simply fill in the form at www.micromart.co.uk or send your ad by post to Maaya Mistry, Micro Mart, Dennis Publishing, 30 Cleveland Street, W1T 4JD

HARDWARE FOR SALE

Have you got any old kit lying around you'd like to get rid of? Fancy making a few pounds while you're at it? Why not advertise in the Micro Mart classifieds? It's easy and it's free, just email what you've got, how much you'd like for it, and your contact details to micromartclassifieds@gmail.com, and we'll do the rest. There are thousands of enthusiastic readers out there looking for components every week, and you may have something unwanted they've been searching for, so get in touch and save your kit from going to the tip!

Asus M2N2-SLI Deluxe motherboard bundle. With AMD Athlon 64 4000 CPU, 4Gb Corsair ram, fan, backplate, manual, driver CD. £40
Email: david.white38@ntlworld.com

IBM / LENOVO SFF BASEUNIT. P4 / 2.8 H-T, 2.0 gigs ram, 40 gig Hard Drive, CD-Rom, 10/100 Network, sound, USB, Clean install XP-pro, fully updated, Office Suite, Anti-Virus, & all usual utilities, COA Licence Sticker & Install media, £25
Tel: Pat (07710) 348638 Email: pat4cars@aol.com

FUJITSU-SIEMENS MINITOWER. Pentium D 2.8 Dual-Core, 2.0 gigs Ram, 80 gig Hard Drive, DVD-RW, Gigabit network, sound, Clean Install XP-pro, fully updated, Office suite, Anti-Virus & all usual Utilities, Legal COA sticker & System Image. £35
Tel: Pat (07710) 348638 Email: pat4cars@aol.com

DELL OPTIPLEX GX240 SFF. P4 / 1.6, 20 gig hard Drive, 768mb ram, CD-Rom, 10 / 100 network, Sound, Front USB, , Clean install XP-pro, fully updated, Works OK but slow by modern standards, £15.
Tel: Pat (07710) 348638 Email: pat4cars@aol.com

LG Flatron W2246S 22" monitor. Includes power and VGA leads. No dead pixels in very good condition. £50 Buyer Collects from Verwood Dorset.
Tel: (01202) 826057 Email: geoffandcynth@themailspot.com

2 x 512MB PC3200 DDR400. These two sticks were removed from my working system, now redundant. £5, plus £1 p&p.
Tel: Alan (02084) 202322 Email: alan@asandco.co.uk.

2 x 1GB PC2100-648. These two matched sticks were removed from one of my redundant systems. Plus one PC2700 (DDR 333MHz) and one 512Mb PC3200 DDR400 stick. All for £5 plus £2 P&P.
Tel: Alan (02084) 202322 Email: alan@asandco.co.uk.

Two 120GB Maxtor DiamondPlus 9 Drives plus one 80GB DiamondPlus 10. Can be supplied with two plug-in caddies. No reasonable offer refused.
Tel: Alan (02084) 202322 Email: alan@asandco.co.uk.

SAMSUNG GALAXY Tab 3 for sale. 2mths old, 8gb, wifi, £80 open to offers. Willing to post at a charge.
Tel: Christine (01386) 831836

HP Elitebook 8760w i7 2820QM @ 2.2ghz 32GB RAM 750GB HDD Quadro 4000M GPU. Only 2 small marks on whole machine. Cost £3500 when new. £900 ONO
Tel: (07772) 926632 Email: stedaley19@gmail.com

WD 2TB desktop hard disk. Formatted ready for an operations system. Runs very nicely. New laptop means my desktop items must all go! £40 includes free tracked postage.
Tel: (01619) 501218 Email: jmbest2@sky.com

Asus P8Z68-v LX socket 1155 motherboard. Original box 1/0 cover user guide driver disk fitted core i3 2100 CPU 3.1GHz and 8GB PC1300 memory. No fan. Working fast and fine. £125 + free postage.
Tel: (01619) 501218 Email: jmbest2@sky.com

Asus p8h61-mle motherboard socket 1155. Original box 1/0 cover driver disk manual together with Celeron 9160 dual core CPU and 4 9195 pc1300 memory. Working fine. No fan. £70 + free postage.
Tel: (01619) 501218 Email: jmbest2@sky.com

Toshiba Satellite SA60 laptop. Model PSA60E-092058EN. Windows XP Home Edition with Certificate of Authenticity. For spares or repair - broken power connector on mobo. No power cord. Otherwise very good condition.
£40.00 + p&p
Tel: Peter Scarth (01452) 372350 Email: pscarth@blueyonder.co.uk

SoundBlaster Audigy SE 7.1 soundcard for sale. Perfect working order. Selling due to not being needed any more. Just £12 plus postage.
Tel: Ian (01132) 629028 Email: ianmatthewuk@yahoo.co.uk

Toshiba C500D-B-11 laptop. Virtually new cost £279 will accept £150 O.N.O.
Tel: (01217) 535324

Apple Touch 32 GB iPod. Virtually new cost £199 will accept £100 O.N.O.
Tel: (01217) 535324

HP 4Gb memory Microserver with two hard disc drives. £110. One with Linux MINT. Other with Linux FreeNAS. This will also run Windows 7 and Windows Server or Home Server. (Win 8 I've not tried it) Two spare HD slots with appropriate caddies. Slot for your SATA DVD drive also, (or use external usb or DVD drive if needed. 4 usb sockets on front, 2 on rear. VGA, network, power sockets on rear. Supplied in original HP box with CD and leaflets etc. Collect from Harrogate, North Yorks, or posted via Hermes for £12 (or less if I can do it). Cash on inspection and collection. (Highlands and Islands might obviously cost more on delivery)
Tel: (01423) 872045 Email: it_central@ntlworld.com

400GB IDE drive 3.5 inch formatted ready for use. Only £20 plus £3 for p&p. I can load genuine XP Professional from Microsoft with genuine certificate of authenticity for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Amstrad PCW 9256 in good working condition with software. Offers.
Tel: John Adams (02088) 641202 Email: meeching@uwclub.net

CRUCIAL 8GB (4x2). PC3-10600 unbuff. CT25664-BA1339A. (4X2) = £48.00. (2X2) = £25.00. Boxed kit of CORSAIR Vengeance 4GB (2X2) = £35.00. Prices include P&P.
Tel: Bob Williams (01507) 602914 Email: flipinek@hotmail.co.uk

EPSON PRINTERS T715 12 multipack F.O.C. to good home, just pay postage £2.50. (Tesco equivalent original cartridges £120 current special offer!) Perfect crisp printing etc.

Tel: Pete Dew: (07526) 988594

EPSON PRINTERS T481-T486 6 multipack F.O.C. to good home, just pay postage £2. Perfect crisp printing etc.

Tel: Pete Dew (07526) 988594

EPSON PRINTERS T711 6 multipack F.O.C., just pay postage £2. Perfect crisp printing etc. May have others F.O.C. if model older than 12 months.

Tel: Pete Dew (07526) 988594

Intel 3930K processor. Used, but not overclocked. No box or fan. £220 ono. Will ship to UK address.

Tel: Tim (01623) 624509 Email: tim.stirland@btinternet.com

Apple Mac G4 Tower. 400MHZ cpu, 640MB Ram, 2xHardDrive 40GB,20GB. DVD & ZIP Drive. OS X v10.3 Panther+OS9. NO KEYBOARD OR MOUSE. £25 ono Buyer collects

Tel: (07941) 254296 Email: jasonnd@hotmail.com

Wireless Motorised IP Surveillance Camera. White In Colour - Control from your mobile phone / tablet / pc when out of the home - ideal for home security , baby monitoring, has sound and remote recording etc Brand new in Box - £25 Price includes post and packing.

Email: omendata@gmail.com

Blueberry I-MAC. Good condition, all in working order, £55.

Tel: (01386) 832758

Lexmark Printer Z601, still working and in good condition, £25.

Tel: (01386) 832758

Dell Inspiron 660 Intel i5 QUAD CORE with ACER 23 Inch LED monitor. AS NEW. Operating System: Windows 8.1. MPN:620MT. Memory (RAM): 4 GB. Hard Drive: 1 TB. Processor Type: Intel Core i5. Primary Drive: Optical DVD+-RW, Processor Speed: 3.0 GHz, Features: Graphics Card GT620 1GB. Acer LED monitor 23" HD. £520
Tel: Hitesh Rao (01163) 198895

PRINTER CARTRIDGES. Suitable for Epson printers range T711 - T714. Work perfectly. 50 pence each, plus postage (brand new unused sealed). Over a dozen available.

Tel: (07541) 222678 Email: petedew@gmx.co.uk

Panasonic KX-P7105 mono laser duplex printer. Some toner left. Up to Windows XP only - hence £25. Buyer collects from N2, East Finchley
Tel: (02083) 431527 Email: prnikiel@gmail.com

INKJET CARTRIDGES suitable for Epson Printers T711 - T714 range, and T481 - T486 range. 79 pence each, plus postage. Work perfectly, good crisp printing quality.

Tel: (07526) 988594 Email: petedew@gmx.co.uk

50 copies of Micro Mart magazine. Mainly 2013 through 2014. Pick up as heavy. Devon. Price £20, Tel: David Pike (01404) 813691

Powered PCI Express x1 To x16 Riser Card Extension via USB 3.0 + Power Cable Adaptor. Allows you to add an extra Pci-ExpressX16 slot to your pc converting an existing x1 slot to x16. Useful for adding an

Extra graphics card to create a Crossfire triple configuration or for Bitcoin data mining up to 7 cards can be installed using these adaptors. Quality model - Brand new still boxed. £10. Price includes p&p.
Email: omendata@gmail.com

Laptop Removeable drive tray. Allows you to add an extra hard drive to your laptop by taking out the CD/DVD Drive. This device inserts into the Cd/Dvd Empty Slot and holds 1 Hard Drive. Excellent Engineers Gadget - Great for data recovery or just beefing up your laptop. Two types available - standard SATA to SATA or SATA to Ide (Pata) Slot type. Brand New Still In Box. £20.
Email: omendata@gmail.com

Amstrad PCW 9256. In perfect working order including on-top printer with a few 3" disks. Offers.
Tel: John Adams (02088) 641202 Email: meeching@uwclub.net

2 HP Laserjet 3100 printer-fax-copier-scanners. In good working order. £25 each.
Tel: John Adams (02088) 641202 Email: meeching@uwclub.net

Lian Li PC-X2000 Computer Case. Supports mATX, ATX, eATX; hot swap SATA drives, six 3.5" & two 2.5" hot swap disc holders. Three 140mm intake plus two 80mm and one 140mm exhaust fans. £140.
Tel: Ian (01932) 856971 Email: a2345@btinternet.com

1.5tb SATA drive. Fully refurbished by government acknowledged company. All data taken off (some drives are still under Western Digital warranty) ONLY £40 including P & P
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

1tb SATA drive. Fully refurbished by government acknowledged company. All data taken off (some drives are still under Western Digital warranty) ONLY £38 including P & P
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

2tb Western Digital SATA drive. Model WD2002F-YPS 64mb cache, fully refurbished by government acknowledged company. All data taken off (some drives are still under Western Digital warranty) ONLY £50 including P & P
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

GEFORCE 1 GBYTE 24- PCI express PC card. HDMI DVI VGA PC video card. £10 plus p&p £4.50. 2 for sale. £10 each.
Tel: (01707) 339063 Email: awhishaw@aol.com

6 P314 PC bases for sale, £100. The lot all with XP must be collected.
Tel: (02380) 733312 Email: zen96403@zen.co.uk

Motherboard Bundle. 2.4Ghz AMD Athlon XP 32bit CPU 512MB Ram 5xPCI 2IDE LAN sound good for gaming, office work, surfing the net, watching movies generally a good all round system spec can slightly be changed if required please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

4 gb (2 x 2gb) of OCZ Reaper PC2 6400 ddr2 memory. Fast gaming memory, used but in excellent condition, £49.95 inc postage.
Email: baslake@blueyonder.co.uk

500GB SATA drive. 3.5" formatted ready for use. Software can be installed for an extra charge. Windows 7 extra £35 includes disk and certificate of authenticity. Only £23 including P&P.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

Retro Commodore 64 with 1541 disktrive tapedeck. All in original boxes, mags. Pick up from Somerset. £75 ono.
Tel: (01278) 691606

6 P3/4 PC bases for sale. £100 the lot. All with XP. Must be collected.
Tel: (02387) 333212 Email: zen96403@zen.co.uk

MAC BOOK PRO A1151. Spares and repairs 17" screen 2.16GHz intel CPU looks in good condition screen appears to work. Please email or call me for a price and more information.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

CISCO CONSOLE CABLES. I have a lot of Cisco console cables all new let me know how many you would like please email or call me for a price and more information.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

750GB SATA drive for sale. Perfect working order. Formatted ready to use. Only £25 plus £3 p&p. Genuine Windows XP with Certificate of Authenticity can be pre installed for an extra £10.
Tel: Dave Thomas (01942) 706572 Email: dethomas96@aol.com

Six p3/p4 PC with XP. £100 the lot. Buyer collects. Get in touch for more information.
Tel: (02380) 733312 Email: zen96403@zen.co.uk

Socket 775 System. Coolermaster Case, audio + USB. Asus P5KPL-AM EPU E6600 CPU. 250 GB Hdd. DVDRW, ATI 5400. Boxes, drivers. Samsung 19" Monitor HDMI USB. Keyboard mouse. Windows 7 Professional SP1. £100 collect from Louth, Lincolnshire.
Tel: (01507) 602914 Email: flipinek@hotmail.co.uk

2 x 2GB Samsung DDR3 pc3-8500 1066 SODIMM. 204 pin as new laptop memory. £15 inc postage to inland UK.
Email: jvital@mail2web.com

HP 5101 5102 5103 Netbooks and Notebooks. Lots of parts available down to the tiniest screw. Contact with requirements.
Tel: (01892) 833413 Email: fwfkent@gmail.com

Dell OptiPlex 755 (80 GB, Intel Core 2 Duo, 2.33 GHz E6550, 1GB memory, DVD/CDRW) Ultra small form factor. Fantastic small and very fast computer. You will need to load the drivers. XP Pro or Vista Business can be loaded for an extra £10. The hard drive and memory can be upgraded for an extra cost. £70 plus £10 for delivery.
Tel: Dave Thomas (01942) 706572 Email: dethomas96@aol.com

Internal Card Reader. Compatible with most camera memory cards. Also has a USB port. Colour: black or silver. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

AGP, PCI and PCI-e graphics cards. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Motherboard Bundle. 3Ghz AMD 64bit CPU 512MB Ram 5xpc1 2xSATA 2IDE 1Gb LAN 6 channel sound firewire. Comes with driver CD and manual. Good for gaming, office work, surfing the net, watching movies, generally a good all round system. Spec can slightly be changed if required. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

PC gaming hardware. I have got 1 x force feedback steering wheel, 1 x force feedback joystick, 1 x normal joystick, lots of game pads. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Vintage Apple Macintosh Classic II PC for sale. Complete with keyboard, mouse and microphone. Offers.
Tel: 07733 628986 Email: 576924@tiscali.co.uk

Brand new USB brackets. Add 2 extra USB2 ports to your computer at little cost. Very simple to fit cable connects onto the motherboard and uses a spare slot on the back of your computer. No drivers required. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Internal 3 1/4 floppy drives. Choice of white/black/silver/no face plate. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Brand new Laptop bag. Still sealed in the plastic bag and never used (it came as part of a bundle). Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Brand new flatbed scanner. Still boxed and never used (it came as part of a bundle). Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Desktop cases. AT and ATX types and tower and flatbed form factor different sizes and colours can be posted or picked up from Manchester please email or call me with your requirements.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Laptop RAM. 2x1GB PC3-8500 DDR3 1067MHz pulled form a working mac book pro but can be used in other laptops this is the quickest way to boost your laptop's speed. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

160GB 3 1/2 inch desktop Hard drive IDE. Clean pull (little to no use) no bad sectors tested all you need to do is plug in and go. £20 +p&p
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Asus Transformer Prime TF201 Tablet PC. NVIDIA Tegra3, 32GB Flash, 1GB RAM, 10.1" LED, WiFi, Bluetooth, 2 x Webcam, Champagne Gold, Android 4.2, with keyboard dock. £150.00.
Tel: Rob Pratt (01189) 781753 Email: robpratt@bizitsolutions.co.uk

Computer Monitor. HP s2231a. 1080p, 22 inch display, 1920x1080 resolution. 60 Hz, contrast 15,000:1. Price £40 ONO
Tel: Matthew Taylor (01842 813630) Email: chack-pobly12@hushmail.com

Two Apple G4 iBook Laptops. 12" screen, 800 MHZ CPU 640MB RAM. OSX (Tiger) 30GB HDD batteries ok M/Chargers, nice machines. £105 each or £200 for the two.
Tel: Matthew Taylor (01842 813630) Email: chack-pobly12@hushmail.com

Gaming PC HAF-X case. ASUS P6X58D-E, i7 930 4GHz 6GB Corsair i7 mem, gigabyte gtx470, Asetek CPU LCLC 240mm radiator + watercooling. Two 12cm fans, PSU needs replacing. DVDRW, networking, original software, extra cabling. (Price: £400 ONO).

Tel: Matthew Taylor (01842 813630) Email: chack-pobly12@hushmail.com

SATA Drive Tray For Laptops. Allows you to remove your CD/DVD Optical Drive and Insert a second Hard drive. Very useful for backups, file recovery and RAID setup on a laptop. Brand new, still sealed and boxed. £10 including P&P.
Tel: Gary Gemmell (01415) 712822 or (07551) 293083 Email: omendata@gmail.com

Gold Northbridge Heatsink. £3 including P&P.
Tel: Gary Gemmell (01415) 712822 or (07551) 293083 Email: omendata@gmail.com

Rugged Magnesium Alloy cased HP 5101 Business Netbook. 120Gb HDD 2Gb Ram, running Linux Mint 16. Excellent for Uni, Holiday or just as a spare machine. Complete except for PSU. £60 plus £8 P&P
Tel: Fred Lemont (01892) 833413 Email: fwfkent@gmail.com

Midi tower PC. Windows XP, Office XP, 230GB HDD, FDD, 2x DVD drives, HP Photosmart printer & Canon scanner. All relevant discs. £50.00.
Tel: Alan Phillips (01745) 354614. Email: alan.phillips747@talktalk.net

Two Apple G4 iBook Laptops. 12" screen, 800 MHZ CPU 640MB RAM. OSX (Tiger) 30GB HDD batteries ok M/Chargers, nice machines. £105 each or £200 for the two.
Email: micksharp@live.co.uk

XFX Radeon HD 6870, 1GB GDDR5. Original packaging, never overclocked..£75 plus £6.95 pp.
Tel: Simon Hardwicke (01536) 724334 Email: simon.hardwicke1@ntlworld.com

Asus Sabertooth 990FX Mobo. £100 plus £6.95 pp (with Phenom II 980 add £50).
Tel: Simon Hardwicke (01536) 724334 Email: simon.hardwicke1@ntlworld.com

Lian Li PC-X2000 Computer Case. Supports mATX, ATX, eATX; hot swap SATA drive compartment. Includes six 3.5" & two 2.5" hot swap disc holders. Three 140mm intake plus two 80mm and one 140mm exhaust fans.
Tel: Ian (01932) 856971 Email: a2345@btinternet.com

Matricom G Box Midnight MX2 Android HTPC. New boxed. £85 ono. Postage £3.
Tel: Mick Young (02072) 321695 Email: mick.young@o2.co.uk

Funai D50M-100Y VCR recorder, 6 head A2 stereo. New boxed. £90 ono. Postage £4.
Tel: Mick Young (02072) 321695 Email: mick.young@o2.co.uk

Cartridges for a Xerox 8500/8550 Phaser Colour Laser Printer. 6 Black, 5 Cyan, 4 Magenta, 2 Yellow solid block cartridges going very cheap! Check out cost new from Choice Stationery and make me an offer. My Xerox has given up the ghost after several years.
Tel: Ken Driver (01890) 820295 Email: ken@stonehaven2.plus.com

Gaming PC. HAF-X case ASUS P6X58D-E, i7 930 4GHz, 6GB Corsair i7 mem, gigabyte gtx470, Asetek CPU LCLC 240mm radiator + watercooling. two 12cm fans, PSU needs replacing. DVDRW, networking, original software, extra cabling. £390 ONO

Tel: Alex Thomas (01842) 813630 Email: chack-pobly12@hushmail.com

Custom PC. AMD FX-4100, 8Gb Ram, 500Gb HD, DVD Writer, AMD HD-6750 GPU, Keyboard & Mouse, 19 inch LCD Monitor, Genuine Windows 7 Pro, £250 + delivery.
Tel: Mike Whittington (07533) 270020 Email: mike.whittington@blueyonder.co.uk

XFX HD 7950 GPU. I have 2 for sale, both have 6 months guarantee, willing to split, £180 for pair or £100 each + delivery.
Tel: Mike Whittington (07533) 270020 Email: mike.whittington@blueyonder.co.uk

Nvidia GeForce 9500GT Super+ 1GB DDR2 Video Card (Palit). Unboxed. Great Condition. Not Been Overclocked. £30 Inc P&P
Tel: Steven Saward (01354) 656578 Email: steven_saward@sky.com

16GB Corsair Vengeance DDR3 RAM (2 X 8GB). £120 ONO. Brand new and unopened
Tel: Chris Paul (07827) 447779 Email: cmpaul25@gmail.com

New Cooler Master HAF X USB 3.0 XL ATX Case. No PSU. Reason for sale it will not fit in my computer station. Buyer collect only. £80.
Email: paul_999@sky.com

Two laptop hard drives for sale. 1- HITACHI 250GB - SATA3 - 5400rpm. Sell for £25. 2- WD SCORPIO BLACK - 250GB - SATA3 - 7200rpm. Sell for £30. Paypal only please.
Tel: Wolfgang Dahm (07590) 440475

Intel Core 2 Duo T5600 Dual Core Laptop CPU. Removed from working Dell D630 Latitude laptop due to Gfx chip failure. Now no longer needed. Tested and fully working using CPU Burnin test. £15. Price includes P&P.
Tel: Carole Walker (07551) 293083 Email: omen-data@gmail.com

Mini-Usb Finger Optical Laser Mouse. Attaches to your finger and has two side buttons. Great replacement for standard mouse. Ideal for disabled users or for use where a normal mouse would not work. £10 p&p included.
Tel: Carole Walker (07551) 293083 Email: omen-data@gmail.com

HP Elitebook 8760w i7 2820QM @ 2.2ghz 32GB RAM 750GB HDD Quadro 4000M GPU. Only 2 small marks on whole machine. Cost £3500 when new. £900 ONO
Tel: (07772) 926632 Email: stedaley19@gmail.com

WD 2TB desktop hard disk. Formatted ready for an operations system. Runs very nicely. New laptop means my desktop items must all go! £40 includes free tracked postage.
Tel: (01619) 501218 Email: jmbest2@sky.com

Asus P8Z68-v LX socket 1155 motherboard. Original box 1/0 cover user guide driver disk fitted core i3 2100 CPU 3.1GHz and 8GB PC1300 memory. No fan. Working fast and fine. £125 + free postage.
Tel: (01619) 501218 Email: jmbest2@sky.com

Asus p8h61-mle motherboard socket 1155. Original box 1/0 cover driver disk manual together with Celeron 91620 dual core CPU and 4 9130 pc1300 memory. Working fine. No fan. £70 + free postage. Tel: (01619) 501218 Email: jmbest2@sky.com

Toshiba Satellite SA60 laptop. Model PSA60E-092058EN. Windows XP Home Edition with Certificate of Authenticity. For spares or repair - broken power connector on mobo. No power cord. Otherwise very good condition.

£40.00 + p&p
Tel: Peter Scarth (01452) 372350 Email: pscarth@blueyonder.co.uk

SoundBlaster Audigy SE 7.1 soundcard for sale. Perfect working order. Selling due to not being needed any more. Just £12 plus postage.
Tel: Ian (01132) 629028 Email: ianmatthewuk@yahoo.co.uk

Toshiba C500D-B-11 laptop. Virtually new cost £279 will accept £150 O.N.O.
Tel: (01217) 535324

Apple Touch 32 GB iPod. Virtually new cost £199 will accept £100 O.N.O.
Tel: (01217) 535324

HP 4Gb memory Microserver with two hard disc drives. £110. One with Linux MINT. Other with Linux FreeNAS. This will also run Windows 7 and Windows Server or Home Server. (Win 8 I've not tried it) Two spare HD slots with appropriate caddies. Slot for your SATA DVD drive also, (or use external usb or DVD drive if needed. 4 usb sockets on front, 2 on rear. VGA, network, power sockets on rear. Supplied in original HP box with CD and leaflets etc. Collect from Harrogate, North Yorks, or posted via Hermes for £12 (or less if I can do it). Cash on inspection and collection. (Highlands and Islands might obviously cost more on delivery)
Tel: (01423) 872045 Email: it_central@ntlworld.com

400GB IDE drive 3.5 inch formatted ready for use. Only £20 plus £3 for p&p. I can load genuine XP Professional from Microsoft with genuine certificate of authenticity for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

Amstrad PCW 9256 in good working condition with software. Offers.
Tel: John Adams (02088) 641202 Email: meeching@uwclub.net

CRUCIAL 8GB (4x2). PC3-10600 unbuff. CT25664-BA1339A. (4X2) = £48.00. (2X2) = £25.00. Boxed kit of CORSAIR Vengeance 4GB (2X2) = £35.00. Prices include P&P.
Tel: Bob Williams (01507) 602914 Email: flipinek@hotmail.co.uk

EPSON PRINTERS T715 12 multipack F.O.C. to good home, just pay postage £2.50. (Tesco equivalent original cartridges £120 current special offer!) Perfect crisp printing etc.
Tel: Pete Dew: (07526) 988594

EPSON PRINTERS T481-T486 6 multipack F.O.C. to good home, just pay postage £2. Perfect crisp printing etc.
Tel: Pete Dew (07526) 988594

EPSON PRINTERS T711 6 multipack F.O.C., just pay postage £2. Perfect crisp printing etc. May have others F.O.C. if model older than 12 months.
Tel: Pete Dew (07526) 988594

Intel 3930K processor. Used, but not overclocked. No box or fan. £220 ono. Will ship to UK address.
Tel: Tim (01623) 624509 Email: tim.stirland@btinternet.com

Apple Mac G4 Tower. 400MHZ cpu, 640MB Ram, 2xHardDrive 40GB, 20GB. DVD & ZIP Drive. OS X v10.3 Panther+OS9. NO KEYBOARD OR MOUSE. £250 ono Buyer collects
Tel: (07941) 254296 Email: jasonnd@hotmail.com

Wireless Motorised IP Surveillance Camera. White In Colour - Control from your mobile phone / tablet / pc when out of the home - ideal for home security , baby monitoring, has sound and remote recording etc Brand new in Box - £25 Price includes post and packing.
Email:omendata@gmail.com

Blueberry I-MAC. Good condition, all in working order, £55.
Tel: (01386) 832758

Lexmark Printer Z601, still working and in good condition, £25.
Tel: (01386) 832758

Dell Inspiron 660 Intel i5 QUAD CORE with ACER 23 Inch LED monitor. AS NEW. Operating System: Windows 8.1. MPN: 620MT. Memory (RAM): 4 GB. Hard Drive: 1 TB. Processor Type: Intel Core i5. Primary Drive: Optical DVD+/-RW. Processor Speed: 3.0 GHz. Features: Graphics Card GT620 1GB. Acer LED monitor 23"HD. £520
Tel: Hitesh Rao (01163) 198895

PRINTER CARTRIDGES. Suitable for Epson printers range T711 - T714. Work perfectly. 50 pence each, plus postage (brand new unused sealed). Over a dozen available.
Tel: (07541) 222678 Email: petedew@gmx.co.uk

Panasonic KX-P7105 mono laser duplex printer. Some toner left. Up to Windows XP only - hence £25. Buyer collects from N2, East Finchley
Tel: (02083) 431527 Email: pnnikiel@gmail.com

INKJET CARTRIDGES suitable for Epson Printers T711 - T714 range, and T481 - T486 range. 79 pence each, plus postage. Work perfectly, good crisp printing quality.
Tel: (07526) 988594 Email: petedew@gmx.co.uk

50 copies of Micro Mart magazine. Mainly 2013 through 2014. Pick up as heavy. Devon. Price £20,
Tel: David Pike (01404) 813691

Powered PCI Express x1 To x16 Riser Card Extension via USB 3.0 + Power Cable Adaptor. Allows you to add an extra Pci-ExpressX16 slot to your Pc converting an existing x1 slot to x16. Useful for adding an Extra graphics card to create a Crossfire triple configuration or for Bitcoin data mining up to 7 cards can be installed using these adaptors. Quality model - Brand new still boxed. £10. Price includes p&p.
Email:omendata@gmail.com

Laptop Removeable drive tray. Allows you to add an extra hard drive to your laptop by taking out the CD/DVD Drive. This device inserts into the Cd/Dvd Empty Slot and holds 1 Hard Drive. Excellent Engineers Gadget - Great for data recovery or just beefing up your laptop. Two types available - standard Sata To Sata or Sata To Ide (Pata) Slot type. Brand New Still In Box. £20.
Email:omendata@gmail.com

Amstrad PCW 9256. In perfect working order including on-top printer with a few 3" disks. Offers.
Tel: John Adams (02088) 641202 Email: meeching@uwclub.net

2 HP Laserjet 3100 printer-fax-copier-scanners. In good working order. £25 each.
Tel: John Adams (02088) 641202 Email: meeching@uwclub.net

Lian Li PC-X2000 Computer Case. Supports mATX, ATX, eATX; hot swap SATA drives, six 3.5" & two 2.5"
hot swap disc holders. Three 140mm intake plus two 80mm and one 140mm exhaust fans. £140.
Tel: Ian (01932) 856971 Email: a2345@btinternet.com

1.5tb SATA drive. Fully refurbished by government acknowledged company. All data taken off (some drives are still under Western Digital warranty) ONLY £40 including P & P
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

1tb SATA drive. Fully refurbished by government acknowledged company. All data taken off (some drives are still under Western Digital warranty) ONLY £38 including P & P
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

2tb Western Digital SATA drive. Model WD2002F-YPS 64mb cache, fully refurbished by government acknowledged company. All data taken off (some drives are still under Western Digital warranty) ONLY £50 including P & P
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

GEFORCE 1 GBYTE 24- PCI express PC card. HDMI DVI VGA PC video card. £10 plus p&p £4.50. 2 for sale. £10 each.
Tel: (01707) 339063 Email: Email: awishaw@aol.com

6 P314 PC bases for sale, £100. The lot all with XP must be collected.
Tel: (02380) 733312 Email: zen96403@zen.co.uk

Motherboard Bundle. 2.4Ghz AMD Athlon XP 32bit CPU 512MB Ram 5xpc1 2IDE LAN sound good for gaming, office work, surfing the net, watching movies generally a good all round system spec can slightly be changed if required please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

4 gb (2 x 2gb) of OCZ Reaper PC2 6400 ddr2 memory. Fast gaming memory, used but in excellent condition, £49.95 inc postage.
Email: baslake@blueyonder.co.uk

500GB SATA drive. 3.5" formatted ready for use. Software can be installed for an extra charge. Windows 7 extra £35 includes disk and certificate of authenticity. Only £23 including P&P.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

Retro Commodore 64 with 1541 disktrive tapedeck. All in original boxes, mags. Pick up from Somerset. £75 ono.
Tel: (01278) 691606

6 P3/4 PC bases for sale. £100 the lot. All with XP. Must be collected.
Tel: (02387) 333212 Email: zen96403@zen.co.uk

MAC BOOK PRO A1151. Spares and repairs 17" screen 2.16GHz intel CPU looks in good condition screen appears to work. Please email or call me for a price and more information.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

CISCO CONSOLE CABLES. I have a lot of Cisco console cables all new let me know how many you would like please email or call me for a price and more information.

Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

750GB SATA drive for sale. Perfect working order. Formatted ready to use. Only £25 plus £3 p&p. Genuine Windows XP with Certificate of Authenticity can be pre installed for an extra £10.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

Six p3/p4 PC with XP. £100 the lot. Buyer collects. Get in touch for more information.
Tel: (02380) 733312 Email: zen96403@zen.co.uk

Socket 775 System. Coolermaster Case, audio + USB. Asus P5KPL-AM EPU E6600 CPU. 250 GB Hdd. DVDRW, ATI 5450. Boxes, drivers. Samsung 19" Monitor HDMI USB. Keyboard mouse. Windows 7 Professional SP1. £100 collect from Louth, Lincolnshire.
Tel: (01507) 602914 Email: flipinek@hotmail.co.uk

2 x 2GB Samsung DDR3 pc3-8500 1066 SODIMM. 204 pin as new laptop memory. £15 inc postage to inland UK.
Email: jvital@mail2web.com

HP 5101 5102 5103 Netbooks and Notebooks. Lots of parts available down to the tiniest screw. Contact with requirements.
Tel: (01892) 833413 Email: fwfkent@gmail.com

Dell OptiPlex 755 (80 GB, Intel Core 2 Duo, 2.33 GHz E6550, 1GB memory, DVD/CDRW) Ultra small form factor. Fantastic small and very fast computer. You will need to load the drivers. XP Pro or Vista Business can be loaded for an extra £10. The hard drive and memory can be upgraded for an extra cost. £70 plus £10 for delivery.
Tel: Dave Thomas (01942) 706572 Email: davethomas96@aol.com

Internal Card Reader. Compatible with most camera memory cards. Also has a USB port. Colour: black or silver. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

AGP, PCI and PCI-e graphics cards. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Motherboard Bundle. 3Ghz AMD 64bit CPU 512MB Ram 5xpc1 2xSATA 2IDE 1Gb LAN 6 channel sound firewire. Comes with driver CD and manual. Good for gaming, office work, surfing the net, watching movies, generally a good all round system. Spec can slightly be changed if required. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

PC gaming hardware. I have got 1 x force feedback steering wheel, 1 x force feedback joystick, 1 x normal joystick, lots of game pads. Please email or call me for a price.
Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk

Vintage Apple Macintosh Classic II PC for sale. Complete with keyboard, mouse and microphone. Offers.
Tel: 07733 628986 Email: 576924@tiscali.co.uk

Brand new USB brackets. Add 2 extra USB2 ports to your computer at little cost. Very simple to fit cable connects onto the motherboard and uses a spare slot on the back of your computer. No drivers required. Please email or call me for a price.
Tel: David (01616) 888119 **Email:** pcmadnessltd@yahoo.co.uk

Internal 3 1/4 floppy drives. Choice of white/black/silver/no face plate. Please email or call me for a price.
Tel: David (01616) 888119 **Email:** pcmadnessltd@yahoo.co.uk

Brand new Laptop bag. Still sealed in the plastic bag and never used (it came as part of a bundle). Please email or call me for a price.
Tel: David (01616) 888119 **Email:** pcmadnessltd@yahoo.co.uk

Brand new flatbed scanner. Still boxed and never used (it came as part of a bundle). Please email or call me for a price.
Tel: David (01616) 888119 **Email:** pcmadnessltd@yahoo.co.uk

Desktop cases. AT and ATX types and tower and flatbed form factor different sizes and colours can be posted or picked up from Manchester please email or call me with your requirements.
Tel: David (01616) 888119 **Email:** pcmadnessltd@yahoo.co.uk

Laptop RAM. 2x1GB PC3-8500 DDR3 1067MHz pulled form a working mac book pro but can be used in other laptops this is the quickest way to boost your laptop's speed. Please email or call me for a price.
Tel: David (01616) 888119 **Email:** pcmadnessltd@yahoo.co.uk

160GB 3 1/2 inch desktop Hard drive IDE. Clean pull (little to no use) no bad sectors tested all you need to do is plug in and go. £20 +p&p
Tel: David (01616) 888119 **Email:** pcmadnessltd@yahoo.co.uk

Asus Transformer Prime TF201 Tablet PC. NVIDIA Tegra3, 32GB Flash, 1GB RAM, 10.1" LED, WiFi, Bluetooth, 2 x Webcam, Champagne Gold, Android 4.2, with keyboard dock. £150.00.
Tel: Rob Pratt (01189) 781753 **Email:** robpratt@bitsolutions.co.uk

Computer Monitor. HP s2231a. 1080p, 22 inch display, 1920x1080 resolution. 60 Hz, contrast 15,000:1. Price £40 ONO
Tel: Matthew Taylor (01842 813630) **Email:** chack-pobly12@hushmail.com

Two Apple G4 iBook Laptops. 12" screen, 800 MHZ CPU 640MB RAM. OSX (Tiger) 30GB HDD batteries ok M/Chargers, nice machines. £105 each or £200 for the two.
Tel: Matthew Taylor (01842 813630) **Email:** chack-pobly12@hushmail.com

Gaming PC HAF-X case. ASUS P6X58D-E, i7 930 4GHZ 6GB Corsair i7 mem, gigabyte gtx470, Asetek CPU CLCC 240mm radiator + watercooling. Two 12cm fans, PSU needs replacing. DVDRW, networking, original software, extra cabling. (Price: £400 ONO).
Tel: Matthew Taylor (01842 813630) **Email:** chack-pobly12@hushmail.com

SATA Drive Tray For Laptops. Allows you to remove your CD/DVD Optical Drive and Insert a second Hard drive.
Very useful for backups, file recovery and RAID setup on a laptop. Brand new, still sealed and boxed. £10 including P&P.
Tel: Gary Gemmell (01415) 712822 or (07551) 293083 **Email:** omendata@gmail.com

HARDWARE WANTED

Trying to breathe life back into an old machine? Why not submit a wanted ad to MicroMartClassifiedAdverts@gmail.com and see if any of the thousands of computer enthusiasts who read the magazine each week have what you're looking for?

WANTED: Acorn computer either an A5000 or A7000. Also book on teaching yourself binary.
Tel: (07817) 861011 **Email:** Johnhaviland73@gmail.com

WANTED: Corsair PSU cable bag. Please email me if you can.
Email: Paul@planetvoodoo.co.uk

Wanted: HD 3850 Graphics card, must be AGP.
Tel: (07817) 861011

Wanted: Fully working mainboard for AMD socket AM2+/AM3, micro ATX size. Must use DDR2 RAM.
Tel: Brian Taylor (07570) 452557 **Email:** bmorgant@yahoo.co.uk

Wanted: Factory system restore disc for a Dell Inspiron 1750.
Tel: Darren Day (07707) 556193 **Email:** ddshaggy@btinternet.com

SOFTWARE FOR SALE

Microsoft Office 97 Professional. Original disc with key £18 inc postage.
Tel: Andrew (01376) 512118

Windows XP Professional. New and sealed. Book, software and license (certificate of authenticity) 100% genuine and unopened. (Dell branded but will install on any machine) ONLY £15 including P&P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 **Email:** davethomas96@aol.com

Microsoft Office Small Business Edition 2003 with Business Contacts. Legitimate Office Small Office Business Edition comprising Word, Excel, Powerpoint, etc. Comes with small piece of OEM hardware and original license code (coa) £10 incl. delivery, cheque or PO. £10.50 by Paypal.
Tel: (0794) 528857 **Email:** it_central@ntiworld.com

Norton Utilities 16 for 3 PCs. Runs under Windows 8, 7, Vista or XP. Original Symantec CD with unused product key £12.50
Tel: Ian (01932) 856971 **Email:** a2345@btinternet.com

Dell Windows XP Pro SP2 Reinstall Original Cd. Allows You To Restore Your Dell PC / Laptop Without A Licence Key. Brand New Still Packed. £10. Price includes p&p.
Email: omendata@gmail.com

HP Windows XP Pro SP2 Re-Install Cd. Allows You To Restore Your HP PC / Laptop Without A Licence Key. Brand New Still Packed. £10. Price includes p&p.
Email: omendata@gmail.com

HP Windows 7 Pro Sp1 Re-Install Dvd. Allows You To Restore Your HP PC / Laptop Without A Licence Key. Brand New Still Packed. £10. Price includes p&p.
Email: omendata@gmail.com

HP Windows 8 Pro Re-Install Dvd. Allows You To Restore Your HP PC / Laptop Without A Licence Key. Brand New Still Packed. £10. Price includes p&p.
Email: omendata@gmail.com

HP Windows 8.1 Pro Recovery Dvd X 2. Allows You To Restore Your HP PC / Laptop Without A Licence Key. Brand New Still Packed. £15. Price includes p&p.
Email: omendata@gmail.com

Windows 7 ULTIMATE 32 bit version. NEW software and license (certificate of authenticity) 100% genuine and unopened software. ONLY £45 including P & P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 **Email:** davethomas96@aol.com

Windows Small Business Server 2003 Premium Edition. 7 Disc Set. £30.
Email: omendata@gmail.com

Windows Server 2003 R3. 2 Disc Set. £20.
Email: omendata@gmail.com

Windows Vista 32bit for sale. Genuine item with genuine product key. £35 including P&P.
Tel: Ian (01132) 629028 **Email:** ianmatthewuk@yahoo.co.uk

Windows 7 Professional. I have both 32 and 64 bit versions. NEW software and license (certificate of authenticity) 100% genuine and unopened software. ONLY £35 including P & P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 **Email:** davethomas96@aol.com

Windows 8 Professional 64 bit. NEW software HP branded. 100% genuine and unopened software. ONLY £15 including P & P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 **Email:** davethomas96@aol.com

Windows 2000 Professional. NEW software and license (certificate of authenticity) 100% genuine and unopened software. ONLY £15 including P & P
Tel: Dave Thomas (07828) 982930 or (01942) 706571 **Email:** davethomas96@aol.com

Windows Vista Business. New and sealed. Book, software and license (certificate of authenticity) 100% genuine and unopened.(Dell branded but will install on any machine) ONLY £15 including P & P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 **Email:** davethomas96@aol.com

Windows 7 Home Premium NOT BRANDED 32 and 64 bit versions. NEW software and license (certificate of authenticity) 100% genuine and unopened software. ONLY £35 including P & P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571 **Email:** davethomas96@aol.com

Office 2007 Pro Plus for sale. Includes Word, Excel, PowerPoint, Excel, Publisher and Outlook. Disk only with serial number. £40 including postage.
Email: ianmatthewuk@yahoo.co.uk

SOFTWARE WANTED

Wanted: Windows 98 CD ROM operating system with boot disk instruction manual and serial number.

Tel: Craig (07867) 930265 or 01912093677 **Email:** craigtin44@hotmail.com

Wanted: LG GSA 2164 D software disc to replace broken original.

Tel: Glen Fremantle (01387) 248976
Email: bladamsys@yahoo.co.uk

IMPORTANT BUYING ADVICE

We work very hard to police our classified ads, and make them as secure as possible. However, please do your bit too and use the following guidelines:

- Never - NEVER - pay by bank transfer or post out cash, unless you know the trader already, or are sure it is okay to do so. Pay by cheque, Paypal, Nochex etc wherever possible.

- Be wary of anyone who insists on you paying by the above methods if in doubt, get us to check them out by mailing editorial@micromart.co.uk

- Keep copies of all correspondence
- When sending out goods, at the least obtain a certificate of posting from the Post Office

If in any doubt, feel free to mail us at editorial@micromart.co.uk. Every year, thousands of successful transactions take place through our classifieds, and that's just how we like it.

Help us help you keep them one of the safest and most secure places to buy and sell computer kit.

ASK AARON



Meet Aaron Birch.
He's here to help
you with any
general upgrading,
software and system
building issues. He's
got advice aplenty,
and you're very
much welcome to it!

Send your questions to:
Aaron Birch
Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Aaron by email at:
aaron@micromart.co.uk

Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

Aaron

Local Logon

After switching to Windows 8 recently, I'm a little confused about the way the system logs me on. Before Windows 8 I used Windows XP, so I'm a little out of touch when it comes to the changes that have been made since. This may be normal, but I'd like your opinion.

Basically, when I log on to Windows, I have to use what it calls my 'Microsoft account', which is an online account attached to one of my emails. I understand that this lets me access various online features, but I don't like being tied to an online account on my own computer. What if my Internet connection goes down? What if I want to change my passwords? What if I just don't want Windows having access to all of my stuff all the time?

I know this may be a case of an old fuddy duddy fighting progress and change, but I don't think Microsoft should be able to dictate how I use my PC, and what information I provide. I bought the system, paid for it with my own money, so I should surely be able to choose how I use it, right?

Can you shed some light on this, and if possible, provide some way to work around this constant need to sign in with a previously private account?

Thanks in advance,

Microsoft services better for many, as you can easily use and manage them from almost any Microsoft devices, as well as sync and share data between multiple PCs. You can also access the Windows Store. However, it can also be a problem too.

Last week I answered a letter regarding issues with password resets, which highlights one of the most common flaws, and changing the password elsewhere without your PC being able to connect can mean the OS becomes desynchronised, causing log in issues. There are ways around this, which I provided, but there's also another way to stop this altogether. This involves switching to a local Windows 8 account.

Doing this will log into Windows with a local account, one that's stored on your actual PC, and not in the cloud. This means you can log in and do whatever you like on your PC, without having to worry about Internet connectivity, or sharing data online if you don't want to.

To enable this, go to Settings > Change PC Settings > Accounts, and then pick Your Account. Look underneath your account name and you'll see a disconnect option. Click this and enter your Microsoft account password when asked to do so. Next, you need to enter a local account user name and pick a local password. Also make sure you enter a password hint. Finally, click the 'Sign out and finish' button.

With this done, you'll now be able to log on to your PC using the local account instead of the connected one. This can be reversed by simply clicking the 'Connect to a Microsoft account' link on the user account screen.

Be aware that a local account can't access the Windows Store without a valid Microsoft account, and you'll need to create a local account for each PC you use. You'll also be unable to sync data and settings. You may also find many modern applications won't work without a Microsoft account. Still, a local account is the preferred choice for many users.

Windows logins have changed since Windows XP, perhaps no more so than with Windows 8. Your login now uses your Microsoft account, and is tied to all Microsoft services. This all-in-one focus is one of Microsoft's biggest goals in its journey to unite its products. It has benefits, and drawbacks, some of which are going to rub some people up the wrong way, with the log on procedure being one of the most common.

By design, Windows 8 usually needs to access your Microsoft account, and this is then tied to your OS. This interconnectivity does make using

▼ *Switching to a local account in Windows 8 lets you log on without a Microsoft account*

Switch to a local account

Enter the following information. You'll sign in to Windows with a local account from now on.

User name

Password

 ······

Reenter password

 ······

Password hint

 X

Windows Classic

Can you please advise the best way to make Windows 8 work in the same manner as previous versions of Windows? I use Windows 8, but I just can't keep using the new menu and interface, it just doesn't feel right.



I'm always finding it hard to locate my programs and settings, so I'd appreciate a good, and preferably free way to bring back my old Windows interface, and would like to ask that you give me some guidance.

Geoff

The demand for a more retro-style Windows interface for Windows 8 hasn't really died down since the launch of the most recent OS, and it'll no doubt continue to be asked for when Windows 10 arrives in finished form. Due to this demand from users used to Windows' old way of doing things, there are many programs available online that can change various aspects of the Windows 8 GUI to make them more usable for veterans. Some of these programs deal with specific areas of the interface, whilst others are a total overhaul.

One of the most popular options is Stardock's range of tools, including Start8 and ModernMix (www.stardock.com). These are useful and effective tools, but they come at a cost, which is a bit of a drawback.

If you're looking for a free option, Classic Shell is a very good program to go for. It's free, and has a wealth of options that let you tweak Windows 8 in order to make it more familiar. In particular, the program allows you to pick from various Start Menu styles, including Windows 7, and even a classic Windows 95/98 option, and also refines Windows Explorer, returning some classic options we used to take for granted. You can grab Classic Shell from www.classicshell.net, and spend a bit of time getting your GUI exactly how you like it.

◀ *Classic Shell allows the use of more familiar Start Menus*

Email Links

Can you help me? I'm so used to using Windows' older versions, where I could click an email link and it would open up a new mail using my mail program (Thunderbird). In Windows 8 this doesn't happen. Instead, I get the full-screen mail program that Windows 8 uses (and I don't). This means I cannot simply click an email link to quickly send a mail. Can this be changed?

Adi

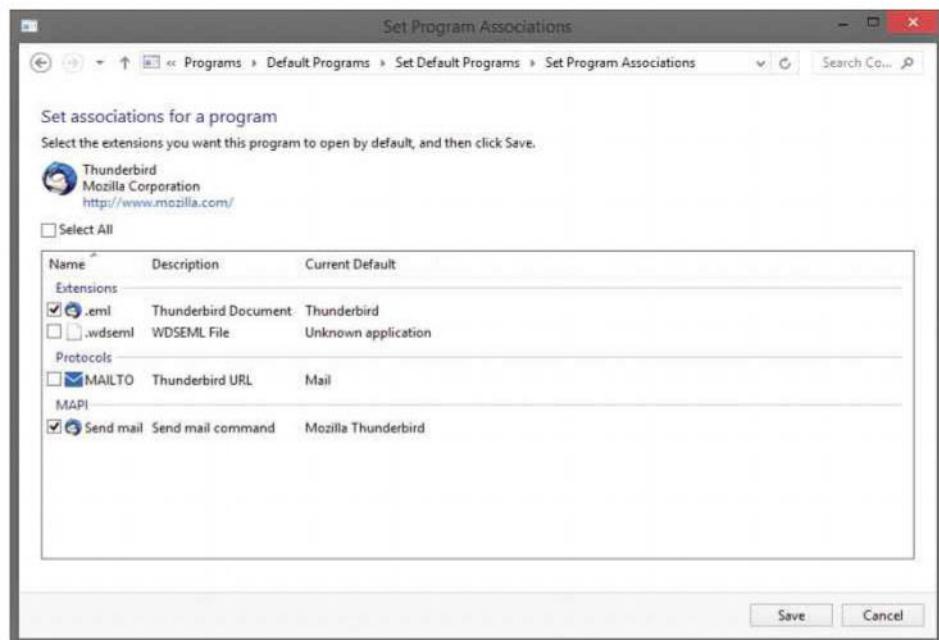
By default Windows 8 will use the Metro mail program, which can be set to check any email accounts, including online options like Gmail. However, this can be changed, and you can set another application to be the default, which will in turn open email links instead.

To do this, simply go to Control Panel and then on into the Programs section. Under the Default Programs entry, select the option to 'Set your default programs' to proceed. Now, use the list to the left to locate Thunderbird, and then click the link to choose new defaults for the program.

On the next screen, pick the MAILTO protocol and tick it, as well as any other options you want to activate, and then click Save.

Any mail links you click from then on should open a new mail using Thunderbird as you prefer, rather than defaulting to the new Windows 8 mail app.

▼ *You can easily change default program settings in Windows 8, including email applications*



UPDATE YOUR DRIVERS

Better drivers have fewer crashes. **Roland Waddilove** shows how to update them and back them up to solve Windows problems

Industrial design (ID) is a blend of art, science and engineering. Industrial design has been successfully applied to furniture, buildings, automotive products and packaging, to name just a few. At its best it enhances a product's aesthetics, ergonomics and usability.

If you have ever had a problem with your computer and contacted any form of technical support and help, one of the stock answers that they give is to update your drivers. It is a driver problem they assure you and they tell you to download new ones from the web. What does this mean and how do you do it?

Actually, telling people to update their drivers sometimes really means that tech support doesn't have a clue what is wrong. It is a standard reply when people have weird problems that have no obvious cause. Sometimes updating the drivers does actually help, so it is not bad advice and it is one of the first tasks to perform when there is an obscure and irritating PC problem..

A computer is a collection of hardware components and there is a disk drive, keyboard, graphics card, Bluetooth, wi-fi, LAN, USB, sound system, laptop trackpad and so on. Each of these components is accessed and controlled by a driver, which is a software program designed specifically for that component. Windows contains drivers for common components, but there are two problems. One is that it does not have drivers for every combination of hardware that can be used to build a PC. Suppliers of less common components must provide their own driver.

Another problem is that Windows drivers are often generic. They work with a wide range of component

brands, but do not take advantage of specific features that may be available. This makes them slow and inefficient. Windows will work with any graphics card, but the performance and features are limited and the manufacturer's driver is always far superior, offering increased speed, more screen modes, and more functions.

Some drivers are rarely updated, but others are frequently updated. New versions are released to fix bugs, add features or boost performance. Graphics drivers are often updated to provide extra speed and compatibility, for example.

If you ever have a problem with Windows that required the operating system to be reinstalled from the original Windows discs, you will then need to find all the drivers that are required for the computer. Sometimes this is easy and the computer manufacturer provides a download from the website, but they may not, or the internet will not work until you have downloaded a driver for the wi-fi or LAN. A driver is needed to download the driver, so you are stuck.

Back Up Your Drivers

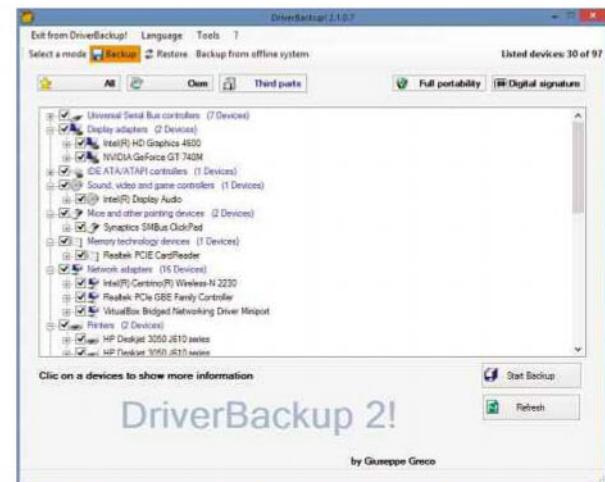
A full system disk image backup is perfect and this creates an exact copy of the disk drive that includes all the drivers. In the event of a problem, you can restore the disk image. Unfortunately, not everyone has a spare USB disk drive to dedicate to backups and they take a long time to perform.

An alternative solution is to just back up the drivers. This is quick and easy, and if there is ever a problem, it is just as quick and easy to restore them.

There are several utilities that can do this and DriverBackup! (sourceforge.



▲ Double Driver is simple, but effective and backs up the PC's drivers



DriverBackup 2!

by Giuseppe Greco

net/projects/drback/) is a free utility for backing up drivers. It is easy to use and clicking the 'Third parts' button selects drivers that are not part of Windows. Full portability selects those drivers that are totally compatible with backup and restore. Click Start Backup and save the backup to an external device, such as a USB disk drive or USB flash memory drive. Don't save them to the internal disk drive because a fault with the disk will mean that the drivers and backup are both lost.

Another useful backup tool is Double Driver (snapfiles.com/get/doubledriver.html). The program

▲ Driver Backup displays all the drivers in the system and backs them up

is several years old now, but it still seems to work and backing up all drivers or just non-Microsoft drivers is straightforward. Just click Scan Current System followed by Backup Now.

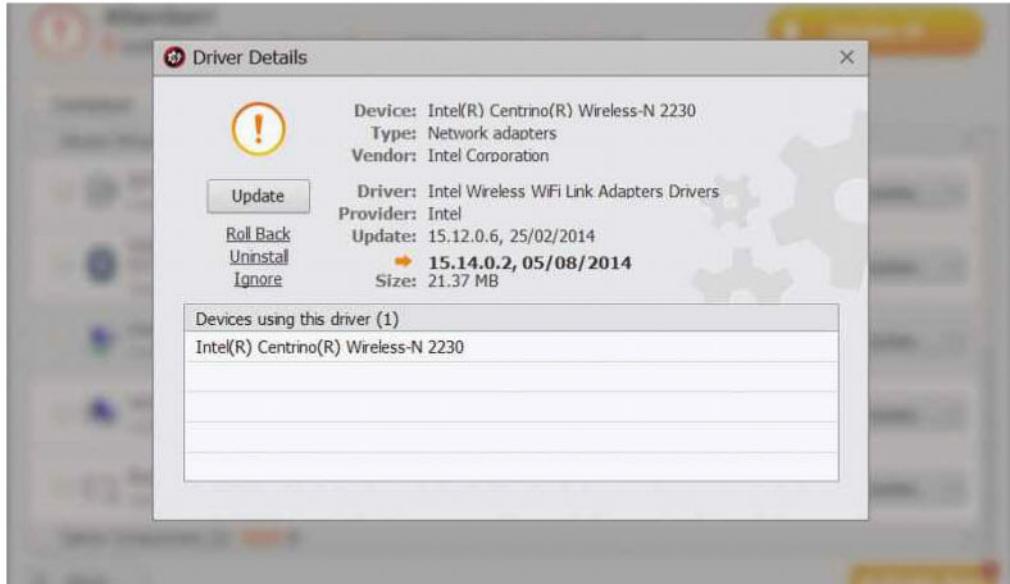
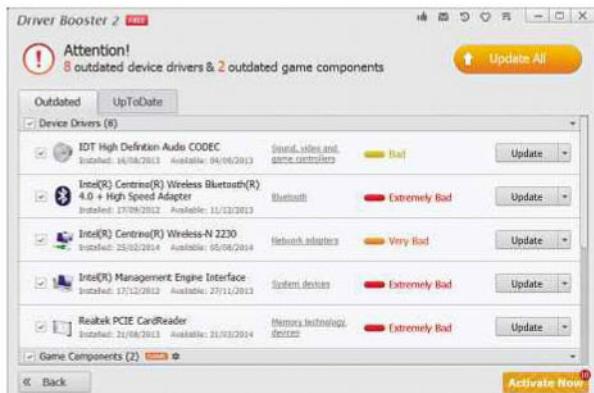
Update The Drivers

There is an old saying that goes 'If it isn't broken, don't fix it', and this is true with drivers. If your computer is running perfectly well and there are no problems, why change the status quo? It is possible that a new driver might offer a slight performance boost, but it could also introduce bugs into the system too. It is a risk.

If you do have a problem and you are not sure what the cause is, updating the drivers is one of the first tasks to perform. It sometimes fixes the problem and even if it doesn't, it eliminates the possibility of it being a driver problem. Tech support will almost certainly ask if you have updated the drivers and replying that you have will progress you faster through the system.

There are several utilities that are able to update the drivers on the

▼ Oh dear, the drivers are bad, very bad and extremely bad! Driver Booster can fix it



“**Telling people to update their drivers sometimes really means that tech support doesn't have a clue**”

computer, but a favourite is IObit Driver Booster (www.iobit.com/driver-booster.php). This is partly because there is a free version and partly because it is up to date. Some driver update utilities are a few years old, which might not matter if you are still running Windows XP, but there is a question mark over whether they are compatible with Windows 8.1 and 64-bit systems. IObit Driver Booster works with anything and was recently updated.

Driver Booster lists outdated and up-to-date drivers on separate tabs, with the outdated ones showing by default. Not only does it list outdated drivers, it comments on them too and they may be classed as bad, very bad or even extremely bad, which is quite amusing. How does Driver Booster decide how bad a driver is? Is it the number of bugs or is it the security flaws? It is not unusual for software to use shock tactics and overstate problems to try to get you to install software, but IObit is a great company with some good products and Driver Booster is free anyway, so however it is measuring the severity of the problem, it is probably right.

There is an Update button next to each of the outdated drivers in the list and clicking it downloads and installs the latest, and hopefully, greatest

driver. The arrow next to the Update button gives the option of viewing the details. You can see the company, size of the download, the current version number of the driver and the version of the latest one, so you can see how out of date your system is. You don't have to install every driver suggested and there is an option to ignore ones you really don't want to change.

Whenever new drivers are installed, there is always the potential for problems and it is unusual, but certainly possible that a more recent version of the driver is not fully compatible with your system. To combat this, Driver Booster first creates a restore point before updating the selected drivers. This means that if the PC is not performing as expected afterwards, you can use System Restore to put it back the way it was. System Restore does more than undo changes to drivers though, so in addition to this, Driver Booster has options to uninstall a driver or to roll back to the previous version. These features go a long way towards protecting you from incompatible updates and are very useful.

The Pro version of Driver Booster, which costs £17.68, has a number of additional features that are useful. The free version detects missing or outdated game components, such as Microsoft DirectX for example, and this is great. The Pro version also has specialised driver tweaking to improve gaming experience, which is interesting and is possibly a way to get that extra bit of performance out of the system. The Pro version also features driver backup and restore, which means you don't need Double Driver or some other utility, and it supports more hardware devices.

There are other driver update utilities, but few of them are free. One that is, is Intel's Driver Update Utility (intel.ly/1AbW4gb). It is specific to Intel chipsets on the motherboard, so it won't find every driver that needs updating, but it is still very useful for basic motherboard drivers. **mm**

◀ View the details for each driver, update it, roll back to a previous version and more

Crowdfunding Corner

Kickstarter might be the biggest crowdfunding platform, but IndieGoGo has its fair share of interesting products too, like this pair of iOS accessories!

iPac-Man

Gaming on an iPad is much better if you've got a controller to play them with – the only problem is that playing games also wears down your battery quicker than almost anything else. Luckily, this product solves both of those problems in one!

The iPad Man combination charger/controller is a 6,000mAh battery charge pack which has a Bluetooth controller built in. Compatible with your iPad, iPhone and iPod Touch (and hey, Android phones too), the hardware allows you to apply a backup charge your tablet even as you play a game thanks to the built-in USB port and battery pack.

The controller has a D-pad, two analogue sticks and 12 buttons in total, as well as an analog mode, so it's suitable for serious gamers. Only 100 units are being produced for the initial crowdfunding campaign and they'll be available exclusively through IndieGoGo. The price of a white/gold or white/silver gamepad is just US\$49 (£31) which includes shipping. You can buy a mounting kit for an extra US\$19 (£12.70). Alternatively, if you want an upscale alternative, there's a strictly limited black/gold model available for US\$99 (£63)!

URL: bit.ly/1yYS31t

Funding Ends: Friday, February 13th 2015



FiiV Case

Although there are hundreds of iPad cases on the market, few get any more complex than adding a fold-down keyboard as part of the package. The FiiV case doesn't have one of those, but it will do much more than the average accessory – it's a smart case which can add features including an always-on data connection.

The way the case works is that it has a standard SIM card slot and the ability to create a wi-fi hotspot. This allows your iPad (or indeed, any other wi-fi device) to connect to the hotspot it creates and share the mobile data connection. If your phone's hotspot feature is disabled or your battery runs out, this'll be the perfect antidote.

The FiiV case is compatible with any SIM, allowing you to choose any network and plan that suits you. You can share the connection with multiple users, and you won't have to worry about the security of public wi-fi spots. The device's internal battery can even be used to charge your iPad in a pinch!

The FiiV case is available for iPad Mini and iPad Air, starting from US\$99 (£63) with US\$15 (£10) international shipping. You can get it in any of several colours, and the retail price of all versions is planned at \$179, so that's a substantial saving. The campaign has to reach a goal of \$50,000, though, so there's a long way to go and, at time of writing, a month in which to cover the distance. It's going to be close!

URL: bit.ly/1BP6arh

Funding Ends: Tuesday, January 20th 2014



Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

Quikkly

David Hayward tackles the more evolved form of the QR code

Q R codes have helped change the way we interact with printed media: be it magazines, manuals, ads, food packaging or any of the other things they're used for. They can be clunky, poorly designed or difficult to scan at times, though. For example: you see a poster with QR code, you point a phone at it, scan it, and then follow the embedded link for more information. What if you could skip a step or two, though? Or perform a complex task?

This is where this week's App comes into its own. It bridges the gap between the digital and real world and makes the connection so much easier than ever before. If QR codes could evolve, then Quikkly would be sporting opposable thumbs.



▲ Quikkly's Action Tags are extremely simple to customise and create

Ever So Quikkly

Quikkly is operated by 'Action Tags', which are designed to be understandable for humans as much as they are for technology. An Action Tag is an image that the app can read and utilise immediately, but that can automatically prompt a range of different actions. So, if our aforementioned poster had a Quikkly Action Tag – a truncated QR-like code twinned with a recognisable image (say, the YouTube logo) and text – when scanned, with the app it will automatically skip straight to an informational video. Twinned with a Facebook logo, a similar link could allow you to Like a Facebook page and so on. This way, a business card, Twitter account, Instagram link, Soundcloud location, and even a Spotify track can be accessed without having to go through the usual rigmarole of changing apps according to the scanned content.

You can even automatically setup a wi-fi link with a shop or establishment using an Action Tag. All you need to do is scan the tag and Quikkly will do the rest. In addition, you can also customise and create



▲ They're also easy to use and make more sense than normal QR standards

your own Quikkly Action Tags for virtually any situation and using any of the regular external sites or services.

Everything from business cards, shop discounts, Follows, adding an event automatically into your calendar and many other tasks are made clearer through the Action Tags in Quikkly. What's more, because they feature words and an image, they're not hiding behind the meaningless dots and bars that make up a QR code.

Conclusion

Quikkly is a superb app and the true successor to bar and QR codes. It's free, easy to use and is extremely powerful when utilised correctly. Well worth looking into and creating your own Quikkly codes for a multitude of uses – both personally and for business. **mm**

Features At A Glance

- Free
- A simple 'scan and done' approach
- Custom Action Tags
- Easily readable Action Tags

Logging Off

In the past, if someone had funded me to build my dream PC I'd have built some utter monstrosity. It would have had a case the size of an American fridge, sported a multi-core CPU or even multiple processors, together with water cooling and multiple video cards. Strangely, none of that seems as exciting to me these days. Perhaps I've got older and matured a little, but I suspect it has more to do with learning to find enjoyment in the simple things, and with more granular computing solutions.

I mention this now, because it is usually at this time of year I start to plan how I'll change my own desktop system over the

coming year. Usually I've got all manner of ambitions to uprate the RAM, video card and storage but, oddly, this year I've concluded that I'm happy with my rig, almost entirely as it is.

These days I run a quad core Intel Core i5-4430 processor at stock 3GHz on an MSI Z87 motherboard, with a Zotac GeForce GTX 660 video card. I don't get much time for games, so that's more than enough performance for office applications and media work, in fact it's overpowered for how I use it.

Storage is provided by a Crucial M500 SSD 480GB and a Western Digital Black 1TB hard drive, with the SSD containing Windows 7 and the apps. The hard drive is mostly for data, but is usually only 50% occupied at worst.

I've got bigger drives, but based on the occupancy, there isn't much point in deploying them. I'm a strong believer these days in delivering an appropriate solution where possible, and this equipment has headroom for whatever I might intend to do with it.

My focus has therefore moved to my network, and how I might improve the services that support so many devices around the house. What I'd like to do is create a more integrated platform where from any device I can access all the others and getting them to do my bidding. Some of this is relatively straightforward, but other parts need some deep thinking about.

There is also a temptation to tie this in with home automation at some point, so that I can administer the heating and lighting centrally. Whatever I do, the PCs and the physical network will be central to my plans, so there may be some work that needs doing to organise them more effectively.

What's really interesting me here is that at this point I don't see an obvious direction to go, or even a clearly defined goal. It is therefore a voyage of discovery, something that is generally more enjoyable than tick-boxing my way to a pre-determined objective. The stage

EDITORIAL

Editor: Anthony Enticknap
theeditor@micromart.co.uk

Designer: Laura Jane Gunnion

Designer: Kevin Kamal

Bonus John: John Moore

Contributors: Mark Pickavance, Shaun Green, Jason D'Allison, Joe Lavery, Sven Harvey, Simon Brew, Shaun Bebbington, Ryan Lambie, James Hunt, Mark Oakley, Ian Jackson, Roland Waddilove, Pizza, Sarah Dobbs, David Hayward, Leo Waldock, Ian McGurren, Aaron Birch, David Briddock, Ian Marks, Craig Grannell, Kevin Pocock

Caricatures: Cheryl Lillie

ADVERTISING

Group Ad Manager:
Andrea Mason
Tel: 020 7907 6662
andrea_mason@dennis.co.uk

Sales Executive:

Finan Tesfay
Tel: 0207 907 6898
finan_tesfay@dennis.co.uk

Sales Executive:

Karl Taylor
Tel: 0207 907 6706
karl_taylor@dennis.co.uk

US Advertising Manager

Matthew Sullivan-Pond
matthew_sullivan@dennis.co.uk

MARKETING

Marketing Manager:
Paul Goodhead
Tel: 0207 907 6393

PRODUCTION

Production Assistant:
Maaya Mistry
0207 907 6079
maaya_mistry@dennis.co.uk

Digital Production Manager:

Nicky Baker

SUBSCRIPTIONS

Save 24% on the cover price:
£77.50 for 51 issues by credit card.
Visit subscribe.micromart.co.uk
Tel: 0845 126 1014

ONLINE SUBSCRIBER SERVICE

www.subsinfo.co.uk
Change your address, renew
subscription or report problems.
UK Subscriptions: 0844 844 0082
micromart@servicehelpline.co.uk

NEWSTRADE SALES

Newtrade Director:
David Barker

COO: Brett Reynolds

CEO: James Tye

Company Founder: Felix Dennis

PUBLISHED BY

Dennis Publishing

30 Cleveland Street
London
W1T 4JD
Tel: 020 7907 6000
www.dennis.co.uk

PRINTING

Printed By: BGP
Distributed By: Seymour

DENNIS PUBLISHING

Group Publisher:
Paul Rayner
paul_rayner@dennis.co.uk

Managing Director:

John Garewal

Group Managing Director:

Ian Westwood

Certified Distribution:

13,712 average copies
Jan-Dec 2010



I'm at now is trying to work out how I'd like it all to work, before I then try to work out how practical that might be, and the best way to deliver those things.

There is always the possibility that I'll junk the whole idea or come up with an entirely different plan, who knows? The unpredictable nature of technology is what still keeps me writing about it each week. The true joy of these projects is amazing range of technologies available these days, providing literally endless possibilities for those willing to spend time embracing them.



Mark Pickavance

LAST WEEK'S CROSSWORD

Across: 7 Upload Video, 8 Plugin, 9 Shadow, 10 Warning, 12 Henry, 14 IPCop, 16 Presume, 19 McAfee, 20 Evolve, 22 Theoretical.

Down: 1 Pull, 2 Slogan, 3 Cannons, 4 Avast, 5 Adware, 6 Hologram, 11 Ampacity, 13 Ardente, 15 Offset, 17 Slouch, 18 Genre, 21 Volt.

DISCLAIMER

The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. As we work our way towards Blue Monday (that day at the end of January that's traditionally greeted with a deluge of 'The Most Depressing Day Of The Year' stories all across the web, not the indie/dance classic that was a hit for New Order in 1983 and at various times since), it's important to keep one's pecker up with a little bit of humour; however,

having ploughed through the Tim Vine joke book we found under our Christmas tree, as we reach the middle of January we're probably going to run out of options pretty soon. There's certainly something amazingly dull about this time of year – the fallout from major holidays is pretty much always like this, but Christmas into January is especially unpleasant. In fact, it's just the kind of time you want to curl up with a warm controller of your choice and play a good old-fashioned computer game in the warm and forget all about the world outside, which (we've just decided) is exactly what we're going to do as soon as this is typed. Oh, and attack what's left of the Christmas chocolates. Can't forget the Christmas chocolates... And if anyone wants to pop around to make us a cuppa, that'd be great too.

THIS WEEK'S CROSSWORD

Across

- 7 The number of beats per second, equal to the difference in the frequencies of two interacting tones or oscillations. (4,9)
8 Alternative name for a rook in chess. (6)
9 In Greek mythology a handsome youth loved by both Aphrodite and Persephone. (6)
10 Apple Inc CEO. (3,4)
12 A mixture containing two or more metallic elements or metallic and nonmetallic elements fused together when molten. (5)
14 The thick short innermost digit of the human forelimb. (5)
16 A word that both sounds and is spelled the same as another word but has a different meaning. (7)
19 He ancient indigenous religion of Japan lacking formal dogma; characterized by a veneration of nature spirits and of ancestors. (6)
20 In mathematics to find how many times a number contains another number. (6)
22 Any collection of valuables that is discovered. (8,5)

Down

- 1 Pre-release version of a software application frequently made available to testers for evaluation. (4)

- 2 A crackling or hissing noise caused by electrical interference. (6)

- 3 Each of two ancient Roman magistrates ranking below consul. (7)
4 Having the same quantity, value, or measure as another. (5)
5 Multiplayer first person shooter game in which the downtrodden "Minutemen" are pitted against their oppressors, Darkwater Inc. (6)
6 Bitterness or ill feeling. (8)

- 11 Test for colour blindness in which the subject is asked to distinguish numbers printed in coloured spots on a background of spots of a different colour or colours. (8)
13 Leading dictionary and thesaurus programme for Windows computers. (7)
15 Handbook or digital document associated with a particular hardware or software application. (6)
17 In logic to alter a proposition so as to infer another proposition with a contradictory predicate. (6)
18 A series of manned Soviet orbiting spacecraft, used to investigate the operation of orbiting space stations. (5)
21 TV Channel: The home of witty banter. (4)



In Next Week's Micro Mart*

- Networking special!
- What will next-generation network technology offer?
- How to improve your wi-fi
- Home media sharing demystified
- Plus the usual mix of news, reviews and advice



* May be subject to change

We're Not Playing Around

Cool and Quiet. Made for Extreme Gamers. The **Vapor-X** series.



Vapor-X R9 280X OC

Gold Award Winner!

3GB GDDR5 Overclocked, Tri-X fans, Vapor-X technology, tons of features. Is there a better R9 280X out there?



Vapor-X R9 290X OC

The Editors Choice Gold Award

Faster, cooler, quieter. Tons of features - for the Extreme Gamer.

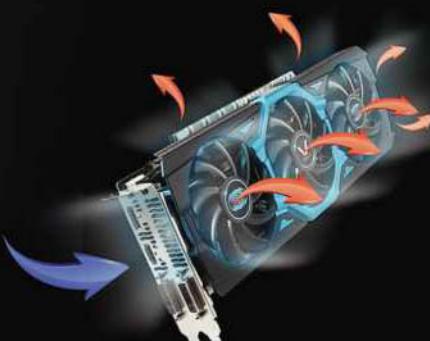
* Now with 8GB GDDR5!



Vapor-X R9 290 OC

Gold Award Winner!

4GB of overclocked GDDR5, Tri-X™ fans, 6 phase power and Vapor-X technology.



Vapor-X™, hot graphics, kept cool.

High-end graphics cards use more power, which means they get hotter quicker. With the innovative Vapor-X, we were the very first to apply aerospace-industry vapor chamber technology to graphic cards. It's a pioneering way to accelerate heat away from the graphics chips into the rest of the cooling system. The result? More silent cooling for extreme performance.



SAPPHIRE
www.sapphirotech.com

©2014 SAPPHIRE Technology LTD. All rights reserved. AMD, the AMD Arrow logo, Radeon and combinations thereof are trademarks of Advanced Micro Devices, Inc. 2014 Advanced Micro Devices, Inc. All rights reserved. AMD, the AMD Arrow logo, AMD OverDrive, Radeon and combinations thereof are trademarks of Advanced Micro Devices, Inc. Microsoft and DirectX are registered trademarks of Microsoft Corporation in the United States and/or other jurisdictions. Other names are for informational purposes only and may be trademarks of their respective owners.



cube

DESIGN YOUR ULTIMATE CUSTOM PC

Box Limited recommends Windows

8.1



Microsoft

The grid is divided into four sections:

- CASE:** Shows various computer cases, including a black tower case with a 'cube' logo and a yellow and black cube-shaped case. Logos for COOLER MASTER and CORSAIR GAMING are present.
- CPU:** Shows Intel Inside logos for Pentium, Core i3, and Core i5, along with their respective processor boxes.
- GRAPHICS:** Shows two graphics cards (MSI GeForce GTX 970 GAMING X) and their boxes.
- STORAGE:** Shows two SSDs (HyperX PURY 120GB and 240GB) and a Seagate SSHD.

+ RAM, COOLING, MOTHERBOARD & MORE

YOUR PC - YOUR CHOICE - DEFINE YOUR DESTINY!

Configure yours now at box.co.uk/custom

Hurricane Gaming PC



- MSI Radeon R7 260X 2GB
- Intel Core i5-4570 CPU
- **Windows 8.1**
- 8GB DDR3 HyperX RAM
- 1TB HDD
- 2 Year Warranty



From £469*

Cube Gamer+ Gaming PC



- MSI Radeon R9 270 2GB
- AMD A10-6790K CPU
- **Windows 8.1**
- 8GB DDR3 RAM
- 500GB HDD
- 2 Year Warranty



From £499*

Cube Horde Gaming PC



- MSI NVIDIA GeForce GTX 750Ti 2GB
- £90 in-game credit*
- Intel Core i5-4460 CPU
- **Windows 8.1**
- 8GB DDR3 HyperX RAM
- 1TB Seagate SSHD
- 2 Year Warranty



From £629*

Buy online at www.box.co.uk Or visit our Birmingham Store



*Prices & offers are correct at time of going to press and are subject to change without notice. Nothing in this advert forms part of any contract. Prices are inclusive of VAT at the current rate of 20%. Box.co.uk is a trading name of Box Limited.